JVC

HR-VP690U/VP790U

JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER

HR-VP690U/VP790U

VHS Hi-Fi SQPB VCR Plus+ G3 CABLE BOX CONTROL

SPECIFICATIONS *(The specifications shown pertain specifically to the model HR-VP790U)*

GENERAL

Power requirement	: AC 120 V ∿ , 60 Hz
Power consumption	
Power on	: 18 W
Power off	: 2.0 W
Temperature	
Operating	: 5°C to 40°C (41°F to 104°F)
Storage	: –20°C to 60°C (–4°F to140°F)
Operating position	: Horizontal only
Dimensions (W x H x D)	: 400 mm x 94 mm x 255 mm (15-3/4" x 3-3/4" x 10-1/16")
Weight	: 3.1 kg (6.8 lbs)
Format	: VHS NTSC standard
Maximum recording time	
SP	: 210 min. with ST-210 video cassette
EP	: 630 min. with ST-210 video cassette

VIDEO/AUDIO

Signal system	: NTSC-type color signal and EIA monochrome signal, 525 lines/60 fields
Recording/Playback system	: DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 230 lines
Frequency range	
Normal audio	: 70 Hz to 10,000 Hz
Hi-Fi audio	: 20 Hz to 20,000 Hz
Input/Output	: RCA connectors (IN x 2, OUT x 1)

TUNER

Tuning system	: Frequency-synthesized tuner
Channel coverage	
VHF	: Channels 2–13
UHF	: Channels 14–69
CATV	: 113 Channels
RF output	: Channel 3 or 4 (switchable; preset to Channel 3 when shipped) 75 ohms, unbalanced

TIMER

Clock reference	: Quartz
Program capacity	: 1-year programmable timer/ 8 programs

Memory backup for timer is not supported.

ACCESSORIES

Provided accessories	: RF cable (F-type), Infrared remote control unit, “AA” battery x 2

Specifications shown are for SP mode unless specified otherwise.
E. & O.E. Design and specifications subject to change without notice.

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The following table lists the differing points between Models (HR-VP690U/U(C) and HR-VP790U/U(C)) in this series.

	HR-VP690U/U(C)	HR-VP790U/U(C)
JOG/SHUTTLE	NOT USED	USED
FOOT LINE	–	GOLD
REAR VIDEO/AUDIO IN	NOT USED	USED
VCR PLUS+	VCR+	VCR+ C3
REC LINK/INPUT	NOT USED	USED/L1
CABLE BOX OR DBS.BOX OR SAT CTL	NOT USED	USED
PAUSE/AV COMPU TERMINAL	NOT USED	USED
CABLE MOUSE TERMINAL	NOT USED	USED
CABLE MOUSE	NOT USED	COUPON

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded ( ) parts are critical for safety.
   Replace only with specified part numbers.
   Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape 3) Spacers 5) Barrier
   2) PVC tubing 4) Insulation sheets for transistors

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

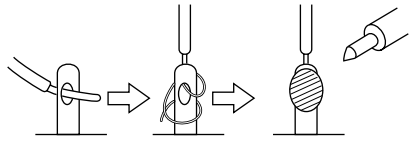


Fig.1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

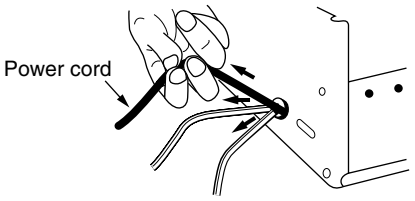


Fig.2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission.
    Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits.
    Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

    1) Connector part number : E03830-001
    2) Required tool : Connector crimping tool of the proper type which will not damage insulated parts.
    3) Replacement procedure
    (1) Remove the old connector by cutting the wires at a point close to the connector.
    Important : Do not reuse a connector (discard it).

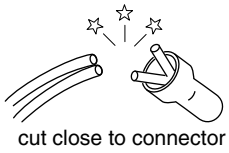


Fig.3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

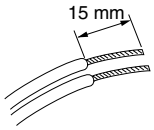


Fig.4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

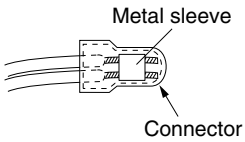


Fig.5

(4) As shown in Fig.6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

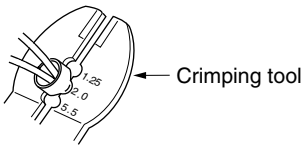


Fig.6

(5) Check the four points noted in Fig.7.

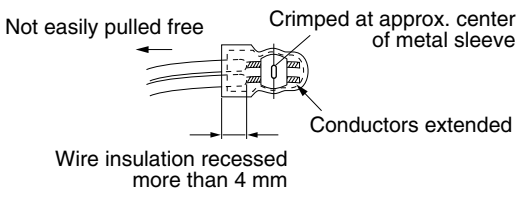

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig.7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

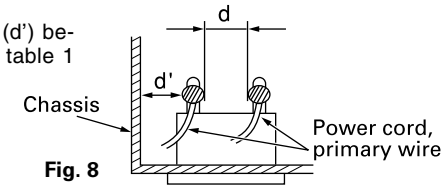


Fig. 8

4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

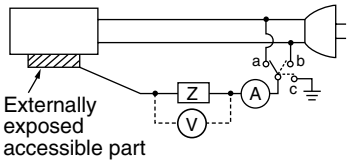


Fig. 9

5. Grounding (Class Ⅰ model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

Measuring Method:

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

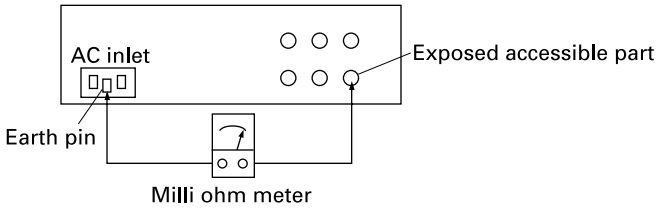


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 miute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	1 MΩ ≦ R ≦ 12 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ/500 V DC	AC 3 kV 1 minute (Class Ⅱ) AC 1.5 kV 1 minute (Class Ⅰ)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 μF, 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

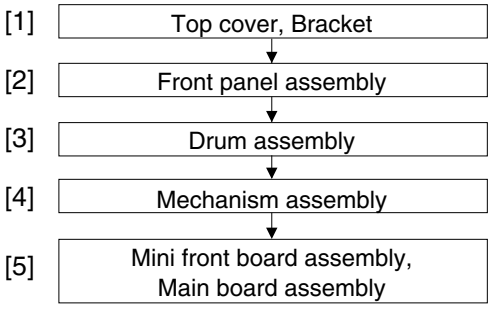
Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

SECTION 1
DISASSEMBLY

1.1 Disassembly flow chart

This flowchart lists the disassembling steps for the cabinet parts and P.C. boards in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in reverse order. Bend, route and dress the flat cables as they were originally laid.



1.2 How to read the disassembly and assembly

<Example>

Step/ Loc No.	Part Name	Fig. No.	Point	Note
[1]	Top cover, Bracket	D1	4(S1a),(S1b),3(L1a), 2(SD1a),(P1a),(W1a), CN1(WR1a), 2(S1c)	<Note 1a>

(1) (2) (3) (4) (5)

(1) Order of steps in Procedure
When reassembling, perform the step(s) in the reverse order. These numbers are also used as the identification (location) No. of parts Figures.
(2) Part name to be removed or installed.
(3) Fig. No. showing procedure or part location.
(4) Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped or unsoldered.
P= Spring, W= Washer, S= Screw, L= Locking tab, SD= Solder, CN**(WR**)= Remove the wire (WR**) from the connector (CN**).

Note:

- ***The bracketed ( ) WR of the connector symbol are assigned nos. in priority order and do not correspond to those on the spare parts list.***

(5) Adjustment information for installation

1.3 Disassembly/assembly method

Step/ Loc No.	Part Name	Fig. No.	Point	Note
[1]	Top cover, Bracket	D1	2(S1a) 2(S1b)	
[2]	Front panel assembly	D2	CN7001(WR2a) [HR-VP790U/U(C)], 7(L2a)	<Note 2a> <Note 2b> <Note 2c>
[3]	Drum assembly	D3	CON1(WR3a), CN1(WR3b), (S3a), (S3b), (S3c)	<Note 2c>
[4]	Mechanism assembly	D4	CN2001(WR4a), (S4a), (S4b), (S4c), (S4d)	<Note 2c> <Note 4a>
[5]	Mini front board assembly [HR-VP690U/U(C)] Main board assembly	D5	2(L5a), CN7001(WR5a) (S5a), (S5b)	<Note 2c>

<Note 2a>

- When reattaching the Front panel assembly, make sure that the door opener “a” of the Cassette holder assembly is lowered in position prior to the reinstallation.

<Note 2b>

- When reattaching the Front panel assembly, pay careful attention to the switch lever not to make it touch the switch knob “b” of the Main board assembly from the side.

<Note 2c>

- Be careful not to damage the connector and wire etc. during connection and disconnection.
When connecting the wire to the connector, be careful with the wire direction.

<Note 4a>

- When it is required to remove the screws (S4a to S4b) retaining the Mechanism assembly, please refer to the “Procedures for Lowering the Cassette holder assembly”(See on page 1-2).
- When reattaching the Mechanism assembly to the Main board assembly, take care not to damage the sensors on the Main board assembly.

Procedures for Lowering the Cassette holder assembly

As the mechanism of this unit is integrated with the Housing assembly, the holder must be lowered and the two screws unscrewed when removing the Mechanism assembly.

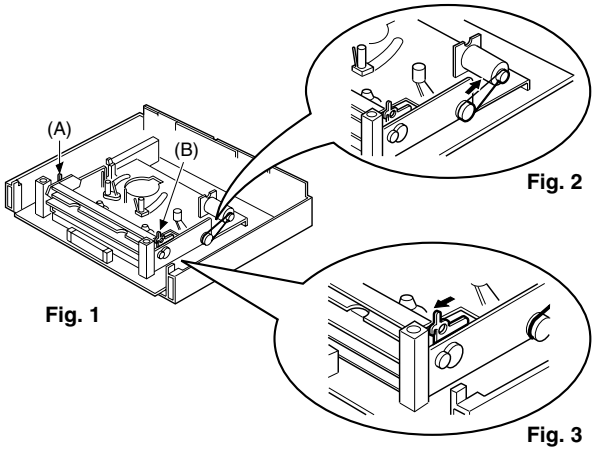


Fig. 1

Fig. 2

Fig. 3

Turn the loading motor pulley in the direction as indicated by Fig.2. As both (A) and (B) levers are lodged twice, push the levers in the direction as indicated by Fig.3 to release them. When pushing the levers, do it in the order of (A), (B), (B), (A). When the holder has been lowered, turn the pulley until the cassette holder is securely in place without allowing any up/down movement.

Procedures for Lowering the Cassette holder assembly

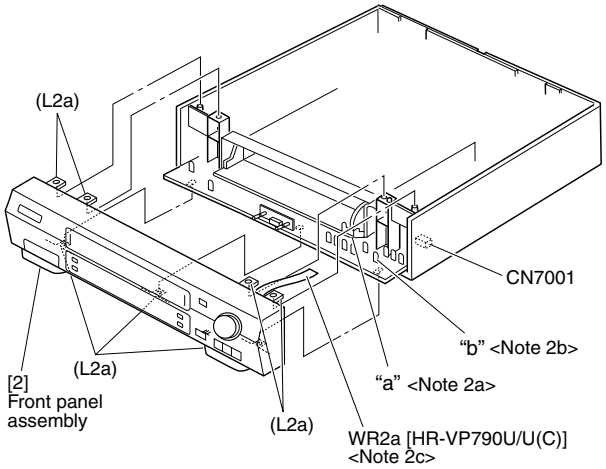


Fig. D2

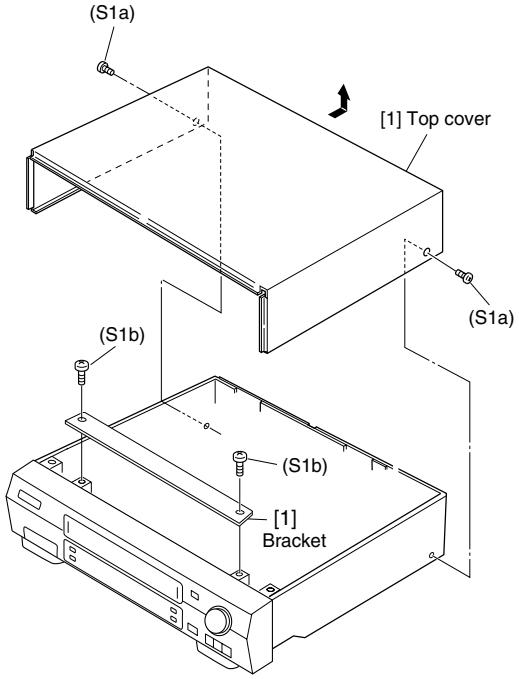


Fig. D1

Note:
When installing the Drum assembly, secure the screws (S3a to S3c) in the order of a, b, c.

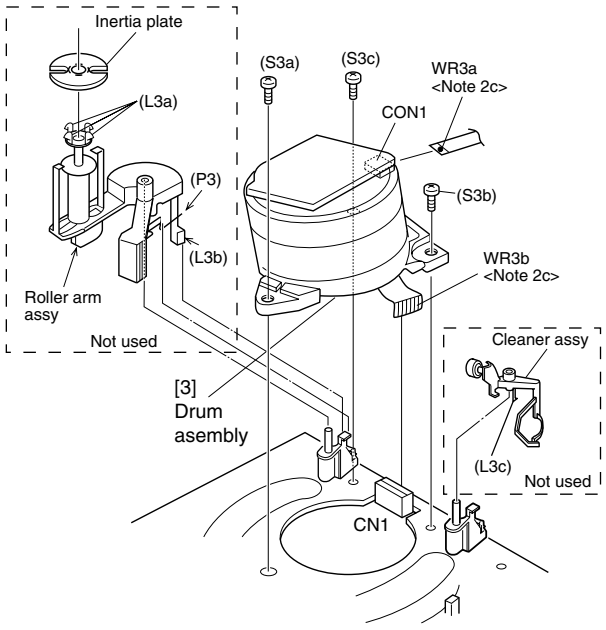


Fig. D3

Note:
When installing the Mechanism assembly, secure the screws (S4a to S4b) in the order of a, b.

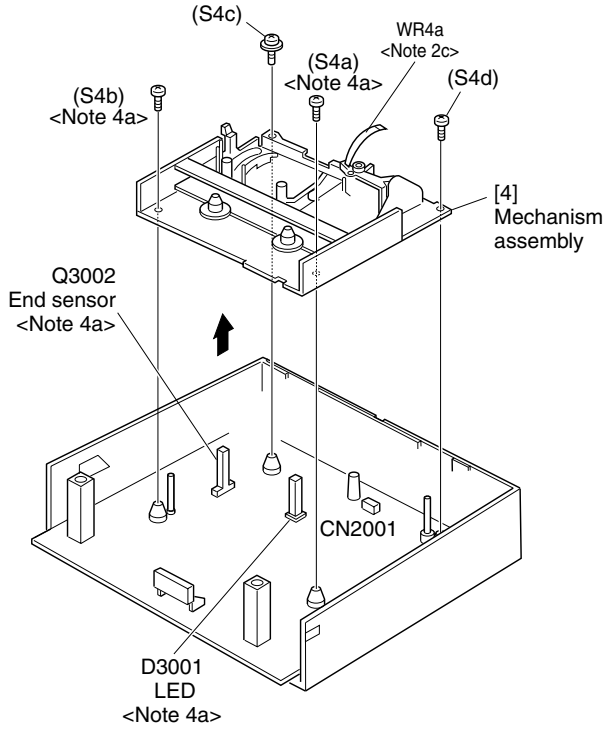


Fig. D4

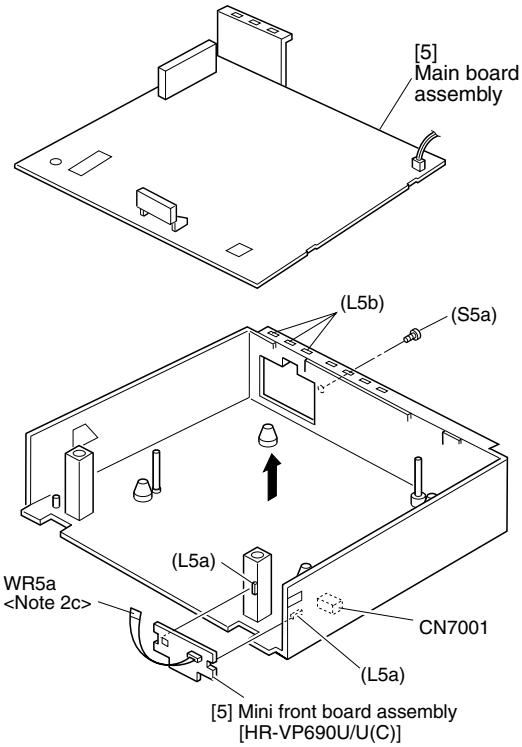


Fig. D5

1.4 Service position

This unit has been designed so that the Mechanism and Main board assemblies can be removed together from the chassis assembly. Before diagnosing or servicing the circuit boards, take out the major parts from the chassis assembly.

1.4.1 How to set the "Service position"

(1) Refer to the disassembly procedure and perform the disassembly of the major parts before removing the Drum assembly.
(2) Lower the cassette holder to prepare for the removal of the Mechanism assembly screws. (Refer to the "Procedures for lowering the Cassette holder assembly" of 1.3 Disassembly/assembly method.)
(3) Remove the combined Mechanism and Main board assemblies.
(4) Connect the wires and connectors of the major parts that have been removed in step (1). (Refer to Fig.1-4-1a.)
(5) Place the combined Mechanism and Main board assemblies upside down.
(6) Insert the power cord plug into the power outlet and then proceed with the diagnostics and servicing of the board assembly.

Notes:

- ***Before inserting the power cord plug into the power outlet, make sure that none of the electrical parts are able to short-circuit between the workbench and the board assembly.***
- ***For the disassembly procedure of the major parts and details of the precautions to be taken, see "1.3 Disassembly/assembly method".***
- ***If there are wire connections from the Main board and Mechanism assemblies to the other major parts, be sure to remove them (including wires connected to the major parts) first before performing step (2).***
- ***When carrying out diagnosis and repair of the Main board assembly in the "Service position", be sure to ground both the Main board and Mechanism assemblies. If they are improperly grounded, there may be noise on the playback picture or FDP counter display may move even when the mechanism is kept in an inoperative status.***
- ***In order to diagnose the playback or recording of the cassette tape, set the Mechanism assembly to the required mode before placing it upside down. If the mechanism mode is changed (including ejection) while it is in an upside down position the tape inside may be damaged.***
- ***The mechanism and board assemblies of this unit are attached by connectors only.***
  When carrying out a diagnosis or repair of the boards in the "Service position", make sure that the connectors are not disconnected.

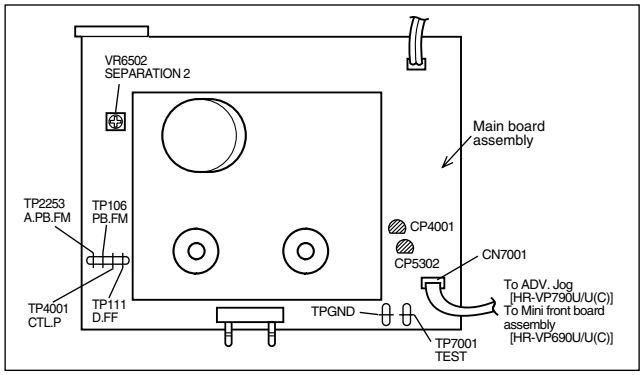


Fig. 1-4-1a

1.5 Mechanism service mode

This model has a unique function to enter the mechanism into every operation mode without loading of any cassette tape. This function is called the "Mechanism service mode".

1.5.1 How to set the "Mechanism service mode"

(1) Unplug the power cord plug from the power outlet.
(2) Connect TPGND and TP7001(TEST) on the Main board assembly with a jump wire.
(3) Insert the power cord plug into the power outlet.
(4) With lock levers (A) (B) on the left and right of the Cassette holder assembly pulled toward the front, slide the holder in the same direction as the cassette insertion direction. (For the positions of lock levers (A) (B), refer to the "Procedures for lowering the Cassette holder assembly" of 1.3 Disassembly/assembly method.)
(5) The cassette holder lowers and, when the loading has completed, the mechanism enters the desired mode.

1.6 Jig RCU mode

This unit uses the following two modes for receiving remote control codes.

1) User RCU mode : Ordinary mode for use by the user.
2) Jig RCU mode : Mode for use in production and servicing.

When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). As both of the above two modes are stored in the EEPROM, it is required to set the VCR back to the User RCU mode each time that an adjustment is made or to check that the necessary operations have been completed. These modes can be set by the operations described below.

1.6.1 Setting the Jig RCU mode

(1) Unplug the power cord plug from the power outlet.
(2) Press and hold the "REC" and "PAUSE" buttons on the VCR simultaneously, while plugging the power cord plug into the power outlet.
  When the VCR is set to the Jig RCU mode, the symbols (" : ") in the time display of the FDP are turned off.

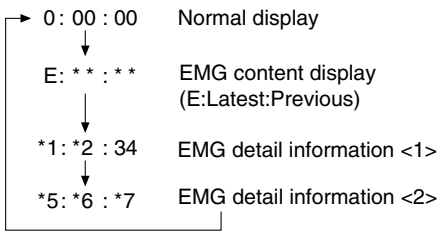
1.6.2 Setting the User RCU mode

(1) Turn off the power.
(2) Press the "REC" and "PAUSE" buttons of the VCR simultaneously. Alternatively, transmit the code "80" from the Jig RCU.

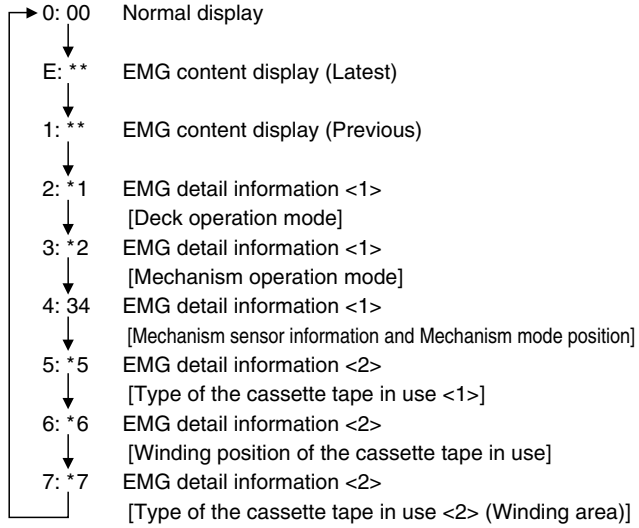
1.7 Emergency display function

This unit has a function for storing the history of the past two emergencies (EMG) and displaying them on each FDP (or OSD). With the status of the VCR and mechanism at the moment an emergency occurred can also be confirmed.

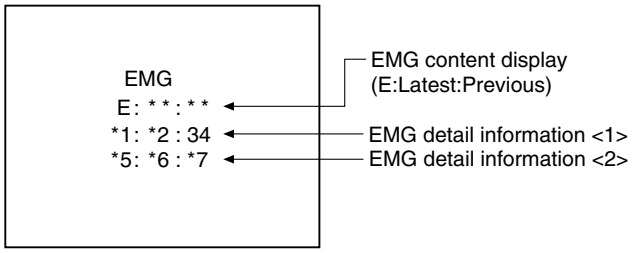
FDP display model
[FDP display]



FDP (7segment LED) display model
[FDP display]



OSD display model
[OSD display]



Notes:

- ***The EMG detail information <1><2> show the information on the latest EMG.***
  It becomes " – – : – – : – –" when there is no latest EMG record.
- ***When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received).***

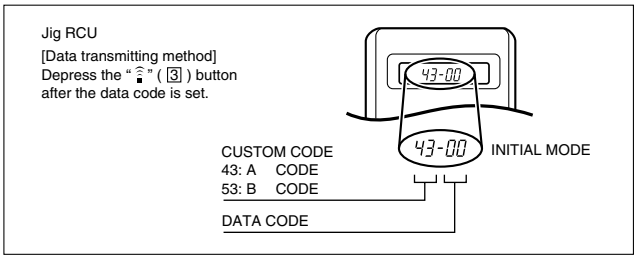


Fig. 1-7a Jig RCU [PTU94023B]

1.7.1 Displaying the EMG information

(1) Transmit the code "59" from the Jig RCU.
The FDP shows the EMG content in the form of "E: * * : * * ".

<Example 1> E : 01 : 03
Previous EMG
Latest EMG

<Example 2> E : – – : – – ← No EMG record

(2) Transmit the code "59" from the Jig RCU again.
The FDP shows the EMG detail information <1> in the form of " * 1 : * 2 : 34 ".

- * 1 : Deck operation mode at the moment of EMG
- * 2 : Mechanism operation mode at the moment of EMG
- 3– : Mechanism sensor information at the moment of EMG
- –4 : Mechanism mode position at the moment of EMG

(3) Transmit the code "59" from the Jig RCU once again.
The FDP shows the EMG detail information <2> in the form of " * 5 : * 6 : * 7 ".

- * 5 : Type of the cassette tape in use <1> .
- * 6 : Winding position of the cassette tape in use
- * 7 : Type of the cassette tape in use <2> (Winding area)

(4) Transmit the code "59" from the Jig RCU once again to reset the display.

Notes:

- ***For the OSD display model, all EMG information are showed by transmitting first code from the Jig RCU.***
- ***For the EMG content, see "1.7.3 EMG content description".***
- ***For the EMG detail information <1> , see "1.7.4 EMG detail information <1> ".***
- ***For the EMG detail information <2> , see "1.7.5 EMG detail information <2>".***

1.7.2 Clearing the EMG history

(1) Display the EMG history.
(2) Transmit the code "36" from the Jig RCU.
(3) Reset the EMG display.

(EMG-02e)

1.7.3 EMG content description

Note: ***EMG contents "E08/E09" are for the model with Dynamic Drum (DD).***

FDP	CONTENT	CAUSE
E01: Loading EMG	When the mechanism mode cannot be changed to another mode even when the loading motor has rotated for more than 4 seconds in the loading direction, [E:01] is identified and the power is turned off.	1. The mechanism is locked in the middle of mode transition. 2. The mechanism is locked at the loading end due to the encoder position reading error during mode transition. 3. Power is not supplied to the loading MDA.
E02: Unloading EMG	When the mechanism mode cannot be changed to another mode even when the loading motor has rotated for more than 4 seconds in the unloading direction, [E:02] is identified and the power is turned off.	1. The mechanism is locked in the middle of mode transition. 2. The mechanism is locked at the unloading end due to the encoder position reading error during mode transition. 3. Power is not supplied to the loading MDA.
E03: Take Up Reel Pulse EMG	When the take-up reel pulse has not been generated for more than 4 seconds in the capstan rotating mode, [E:03] is identified, the pinch rollers are turned off and stopped, and the power is turned off. However, the reel EMG is not detected in STILL/SLOW modes.	1. The take-up reel pulse is not generated in the FWD transport modes (PLAY/FWD SEARCH/FF, etc.) because; 1) The idler gear is not meshed with the take-up reel gear; 2) The idler gear is meshed with the take-up reel gear, but incapable of winding due to too large mechanical load (abnormal tension); 3) The take-up reel sensor does not output the FG pulse. 2. The supply reel pulse is not generated in the REV transport modes (REV SEARCH/REW, etc.) because; 1) The idler gear is not meshed with the supply reel gear. 2) The idler gear is meshed with the supply reel gear, but incapable of winding due to too large a mechanical load (abnormal tension); 3) The supply reel sensor does not output the FG pulse. 3. Power is not supplied to the reel sensors.
E04: Drum FG EMG	When the drum FG pulse has not been input for more than 3 seconds in the drum rotating mode, [E:04] is identified, the pinch rollers are turned off and stopped, and the power is turned off.	1. The drum could not start or the drum rotation has stopped due to too large a load on the tape, because; 1) The tape tension is abnormally high; 2) The tape is damaged or a foreign object (grease, etc.) adheres to the tape. 2. The drum FG pulse did not reach the System controller CPU because; 1) The signal circuit is disconnected in the middle; 2) The FG pulse generator (hall device) of the drum is faulty. 3. The drum control voltage (DRUM CTL V) is not supplied to the MDA. 4. Power is not supplied to the drum MDA.
E05: Cassette Eject EMG	When the eject operation does not complete in 3 seconds after the start, [E:05] is identified, the pinch rollers are turned off and stopped, and the power is turned off. When the cassette insertion operation does not complete in 3 seconds after the start, the cassette is ejected. In addition, when the operation does not complete within 3 seconds after the start, [E:05] is also identified and the power is turned off immediately.	1. The cassette cannot be ejected due to a failure in the drive mechanism of the housing. 2. When the housing load increases during ejection, the loading motor is stopped because of lack of headroom in its drive torque. Housing load increasing factors: Temperature environment (low temperature, etc.), mechanism wear or failure. 3. The sensor/switch for detecting the end of ejection are not functioning normally. 4. The loading motor drive voltage is lower than specified or power is not supplied to the motor (MDA). 5. When the user attempted to eject a cassette, a foreign object (or perhaps the user's hand) was caught in the opening of the housing.
E06: Capstan FG EMG	When the capstan FG pulse has not been generated for more than 1 second in the capstan rotating mode, [E:06] is identified, the pinch rollers are turned off and stopped, and the power is turned off.However, the capstan EMG is not detected in STILL/SLOW/FF/REW modes.	1. The capstan could not start or the capstan rotation has stopped due to too large a load on the tape, because; 1) The tape tension is abnormally high (mechanical lock); 2) The tape is damaged or a foreign object (grease, etc.) is adhered to the tape (occurrence of tape entangling, etc.). 2. The capstan FG pulse did not reach the System controller CPU because; 1) The signal circuit is disconnected in the middle; 2) The FG pulse generator (MR device) of the capstans is faulty. 3. The capstan control voltage (CAPSTAN CTL V) is not supplied to the MDA. 4. Power is not supplied to the capstan MDA.
E07: SW Power Short-Circuit EMG	When short-circuiting of the SW power supply with GND has lasted for 0.5 second or more, [E:07] is identified, all the motors are stopped and the power is turned off.	1. The SW 5 V power supply circuit is shorted with GND. 2. The SW 12 V power supply circuit is shorted with GND.
E08: DD Initialized (Absolute Position Sensor) EMG	When DD tilting does not complete in 4 seconds, [E:08] is identified, the tilt motor is stopped and the power is turned off.	1. The absolute value sensor is defective. (The soldered parts have separated.) 2. The pull-up resistor at the absolute sensor output is defective. (The soldered parts have separated.) 3. Contact failure or soldering failure of the pins of the connector (board-to-board) to the absolute value sensor. 4. The absolute value sensor data is not sent to the System Controller CPU.
E09: DD FG EMG	When the DD FG pulse is not generated within 2.5 seconds, [E:09] is identified, the tilt motor is stopped and the power is turned off.	1. The FG sensor is defective. (The soldered parts have separated.) 2. The pull-up resistor at the FG sensor output is defective. (The soldered parts have separated.) 3. Contact failure or soldering failure of the pins of the connector (board-to-board) to the FG sensor. 4. The power to the sensor is not supplied. (Connection failure/soldering failure) 5. The FG pulse is not sent to the System Controller CPU. 6. The tilt motor is defective. (The soldered parts have separated.) 7. The drive power to the tilt motor is not supplied. (Connection failure/soldering failure) 8. The tilt motor drive MDA - IC is defective. 9. Auto-recovery of the DD tilting cannot take place due to overrun.
E0A: Supply Reel Pulse EMG	When the supply reel pulse has not been generated for more than 10 seconds in the capstan rotating mode, [E:0A] is identified and the cassette is ejected (but the power is not turned off). However, note that the reel EMG is not detected in the SLOW/STILL mode.	1. The supply reel pulse is not generated in the FWD transport mode (PLAY/FWD SEARCH/FF, etc.) because; 1) PLAY/FWD or SEARCH/FF is started while the tape in the inserted cassette is cut in the middle; 2) A mechanical factor caused tape slack inside and outside the supply reel side of the cassette shell. In this case, the supply reel will not rotate until the tape slack is removed by the FWD transport, so the pulse is not generated until then; 3) The FG pulse output from the supply reel sensor is absent. 2. The take-up reel pulse is not generated in the REV transport mode (REV SEARCH/REW, etc.). 1) REV SEARCH/REW is started when the tape in the inserted cassette has been cut in the middle; 2) A mechanical factor caused tape slack inside and outside the take-up reel side of the cassette shell. In this case, the supply reel will not rotate until the tape slack is removed by the REV transport, so the pulse will not be generated until that time; 3) The FG pulse output from the take-up reel sensor is absent. 3. The power to a reel sensor is not supplied.
EC1 or EU1: Head clog warning	Presupposing the presence of the control pulse output in the PLAY mode, when the value obtained by mixing the two V.FM output channels (without regard to the A.FM output) has remained below a certain threshold level for more than 10 seconds, [E:C1] or [E:U1] is identified and recorded in the emergency history. During the period in which a head clog is detected, the FDP and OSD repeat the "3-second warning display" and "7-second noise picture display" alternately. EMG code : "E:C1" or "E:U1" / FDP : "U:01" / OSD : "Try cleaning tape." or "Use cleaning cassette." The head clog warning is reset when the above-mentioned threshold has been exceeded for more than 2 seconds or the mode is changed to another mode than PLAY.	

Table 1-7-3a

1.7.4 EMG detail information <1>

The status (electrical operation mode) of the VCR and the status (mechanism operation mode/sensor information) of the mechanism in the latest EMG can be confirmed based on the figure in EMG detail information <1> .

[FDP/OSD display]

*1 : *2 : 34

*1 : Deck operation mode at the moment of EMG
*2 : Mechanism operation mode at the moment of EMG
3– : Mechanism sensor information at the moment of EMG
–4 : Mechanism mode position at the moment of EMG

Note:

- ***For EMG detailed information <1>, the content of the code that is shown on the FDP (or OSD) differs depending on the parts number of the system control microprocessor (IC3001) of the VCR. The system control microprocessor parts number starts with two letters, refer these to the corresponding table.***

***1 : Deck operation mode**
[Common table of MN*, HD* and M3*]

Display		Deck operation mode
MN*/M3*	HD*	
00	-	Mechanism being initialized
01	00	STOP with pinch roller pressure off (or tape present with P.OFF)
02	01	STOP with pinch roller pressure on
03	-	POWER OFF as a result of EMG
04	04	PLAY
0C	0E	REC
10	11	Cassette ejected
20	22	FF
21	-	Tape fully loaded, START sensor ON, short FF
22	-	Cassette identification FWD SEARCH before transition to FF (SP x7-speed)
24	26	FWD SEARCH (variable speed) including x2-speed
2C	2E	INSERT REC
40	43	REW
42	-	Cassette identification REV SEARCH before transition to REW (SP x7-speed)
44	47	REV SEARCH (variable speed)
4C	4C	AUDIO DUB
6C	6E	INSERT REC (VIDEO + AUDIO)
84	84	FWD STILL / SLOW
85	85	REV STILL / SLOW
8C	8F	REC PAUSE
8D	-	Back spacing
8E	-	Forward spacing (FWD transport mode with BEST function)
AC	AF	INSERT REC PAUSE
AD	-	INSERT REC back spacing
CC	CD	AUDIO DUB PAUSE
CD	-	AUDIO DUB back spacing
EC	EF	INSERT REC (VIDEO + AUDIO) PAUSE
ED	-	INSERT REC (VIDEO + AUDIO) back spacing

***2 : Mechanism operation mode**
[Common table of MN* and M3*]

Display		Mechanism operation mode
MN*	M3*	
00	00	Command standby (Status without executing command)
02	02	POWER OFF by EMG occurrence
04	04	Moving to the adjacent position in the LOAD direction
06	06	Moving to the adjacent position in the UNLOAD direction
08	08	Cassette ejection being executed / Cassette housing ejection being executed
-	0A	Mode transition to STOP with cassette ejection end
0A	0C	Cassette insertion being executed
0C	0E	Tape being loaded
0E	10	Tape being unloaded
10	12	Mode transition to STOP with pinch roller compression ON
12	14	Mode transition to STOP with pinch roller compression OFF
14	16	Mode transition to STOP with pinch roller compression OFF as a result of POWER OFF
16	18	Mode transition to STOP with pinch roller compression ON as a result of POWER ON
18	1A	Mode transition to PLAY
1A	1C	Mode transition to FWD SEARCH
1C	1E	Mode transition to REC
1E	20	Mode transition to FWD STILL / SLOW
20	22	Mode transition to REV STILL / SLOW
22	24	Mode transition to REV SEARCH
24	26	Mode transition from FF / REW to STOP
26	28	Mode transition to FF
28	2A	Mode transition to REW
2A	2C	4 sec. of REV as a result of END sensor going ON during loading
2C	2E	Short FF / REV as a result of END sensor going ON during unloading
2E	30	Mechanism position being corrected due to overrun
80	80	Mechanism in initial position (Dummy command)

[Table of HD]

Display	Mechanism operation mode
00	STOP with pinch roller pressure off
01	STOP with pinch roller pressure on
02	U/L STOP (or tape being loaded)
04	PLAY
05	PLAY (x1-speed playback using JOG)
0E	REC
11	Cassette ejected
22	FF
26	FWD SEARCH (variable speed) including x2-speed
2E	INSERT REC
43	REW
47	REV SEARCH
4C	AUDIO DUB
6E	INSERT REC (VIDEO + AUDIO)
84	FWD STILL/SLOW
85	REV STILL/SLOW
8F	REC PAUSE
AF	INSERT REC PAUSE
C7	REV SEARCH (x1-speed reverse playback using JOG)
CD	AUDIO DUB PAUSE
EF	INSERT REC (VIDEO + AUDIO) PAUSE
F0	Mechanism being initialized
F1	POWER OFF as a result of EMG
F2	Cassette being inserted
F3	Cassette being ejected
F4	Transition from STOP with pinch roller pressure on to STOP with pinch roller pressure off
F5	Transition from STOP with pinch roller pressure on to PLAY
F6	Transition from STOP with pinch roller pressure on to REC
F7	Cassette type detection SEARCH before FF/REW is being executed
F8	Tape being unloaded
F9	Transition from STOP with pinch roller pressure off to STOP with pinch roller pressure on
FA	Transition from STOP with pinch roller pressure off to FF/REW
FB	Transition from STOP with pinch roller pressure off to REC.P (T.REC,etc.)
FC	Transition from STOP with pinch roller pressure off to cassette type detection SEARCH
FD	Short REV being executed after END sensor on during unloading
FE	Tension loosening being executed after tape loading (STOP with pinch roller pressure on)

3– : Mechanism sensor information
[Common table of MN*, HD* and M3*]

Display	Mechanism sensor information				
	MN* / HD* S-VHS SW	M3* CASS SW	REC safety SW	Start sensor	End sensor
0-	VHS	Cassette insertion	Tab broken	ON	ON
1-	VHS	Cassette insertion	Tab broken	ON	OFF
2-	VHS	Cassette insertion	Tab broken	OFF	ON
3-	VHS	Cassette insertion	Tab broken	OFF	OFF
4-	VHS	Cassette insertion	Tab present	ON	ON
5-	VHS	Cassette insertion	Tab present	ON	OFF
6-	VHS	Cassette insertion	Tab present	OFF	ON
7-	VHS	Cassette insertion	Tab present	OFF	OFF
8-	S-VHS	Cassette ejection	Tab broken	ON	ON
9-	S-VHS	Cassette ejection	Tab broken	ON	OFF
A-	S-VHS	Cassette ejection	Tab broken	OFF	ON
B-	S-VHS	Cassette ejection	Tab broken	OFF	OFF
C-	S-VHS	Cassette ejection	Tab present	ON	ON
D-	S-VHS	Cassette ejection	Tab present	ON	OFF
E-	S-VHS	Cassette ejection	Tab present	OFF	ON
F-	S-VHS	Cassette ejection	Tab present	OFF	OFF

–4 : Mechanism mode position
[Common table of MN*, HD* and M3*]

Display			Mechanism mode position
MN*	HD*	M3*	
-0	-7	-	Initial value
-1	-0	-	EJECT position
-	-	-0	EJECT position (Cassette housing drive mode)
-2	-7	-	Housing operating
-	-	-1	Between EJECT and U / L STOP
-3	-1	-2	U / L STOP position
-	-	-3	Guide arm drive position
-4	-7	-4	Tape being loaded / unloaded (When the pole base is located on the front side of the position just beside the drum)
-5	-2	-5	Tape being loaded / unloaded (When the pole base is located on the rear side of the position just beside the drum)
-6	-7	-6	Pole base compressed position
-7	-3	-F	FF / REW position
-8	-7	-F	Between FF / REW and STOP with pinch roller compression ON
-9	-4	-F	STOP with pinch roller compression OFF
-A	-7	-E	Between STOP with pinch roller compression OFF and REV
-B	-5	-	REV (REV STILL / SLOW) position
-	-	-D	REV position
-	-	-C	Between REV and REV STILL / SLOW
-	-	-B	REV STILL / SLOW position
-C	-7	-	Between REV and FWD
-	-	-A	Between REV STILL / SLOW and FWD STILL / SLOW
-D	-6	-	FWD (FWD STILL / SLOW) position
-	-	-9	FWD STILL / SLOW position
-E	-7	-	Between FWD and PLAY
-	-	-8	Between FWD STILL / SLOW and PLAY
-F	-6	-7	PLAY position

Note:
- ***In the case of the "HD" microprocessor, as the display is always "-7" at any intermediate position between modes, the position of transitory EMG may sometimes not be located.***

1.7.5 EMG detail information <2>

The type of the cassette tape and the cassette tape winding position can be confirmed based on the figure in EMG detail information <2> .

[FDP/OSD display]

*5 : *6 : *7

*5 : Type of the cassette tape in use <1>
*6 : Winding position of the cassette tape in use
*7 : Type of the cassette tape in use <2> (Winding area)

Note:
- ***EMG detail information <2> is the reference information stored using the remaining tape detection function of the cassette tape. As a result, it may not identify cassette correctly when a special cassette tape is used or when the tape has variable thickness.***

***5 : Cassette tape type <1>**

Display	Cassette tape type <1>
00	Cassette type not identified
16	Large reel/small reel (T-0 to T-15/T-130 to T-210) not classified
82	Small reel, thick tape (T-120) identified/thin tape (T-140) identified
84	Large reel (T-0 to T-60) identified
92	Small reel, thick tape (T-130) identified/thin tape (T-160 to T-210) identified
93	Small reel, thick tape/C cassette (T-0 to T-100/C cassette) not classified
C3	Small reel, thick tape/C cassette (T-0 to T-100/C cassette) being classified
D3	Small reel, thick tape/C cassette (T-0 to T-100/C cassette) being classified
E1	C cassette, thick tape (TC-10 to TC-20) identified
E2	Small reel, thick tape (T-0 to T-100) identified
E9	C cassette, thin tape (TC-30 to TC-40) identified
F1	C cassette, thick tape/thin tape (TC-10 to TC-40) not classified

Notes:
- ***Cassette tape type <1> is identified a few times during mode transition and the identification count is variable depending on the cassette tape type. If an EMG occurs in the middle of identification, the cassette tape type may not be able to be identified.***
- ***If other value than those listed in the above table is displayed, the cassette tape type is not identified.***

***6 : Cassette tape winding position**

The cassette tape winding position at the moment of EMG is displayed by dividing the entire tape (from the beginning to the end) in 22 sections using a hex number from “00” to “15”.

“00” : End of winding
“15” : Beginning of winding
“FF or ––” : Tape position not identified

***7 : Cassette tape type <2> (Winding area)**

Display	Cassette tape type <2>	
00	Cassette type not identified	
07	Small reel, thick tape	T-5
08 - 0E	C cassette, thick tape	TC-10
09 - 15	C cassette, thick tape	TC-20P
0A - 0B	Small reel, thick tape	T-20
0A - 16	C cassette, thin tape	TC-30
0A - 16	C cassette, thin tape	TC-40
0D - 0F	Small reel, thick tape	T-40
11 - 14	Small reel, thick tape	T-60
15 - 18	Small reel, thick tape	T-80 / DF-160
17 - 1A	Small reel, thick tape	T-90 / DF-180
19 - 1D	Small reel, thick tape	T-100
1D - 21	Small reel, thick tape	T-120 / DF-240
1E - 1F	Small reel, thin tape	T-140
1F - 23	Small reel, thick tape	T-130
21 - 23	Small reel, thin tape	T-160
21 - 23	Small reel, thin tape	T-168
22 - 24	Small reel, thick tape	DF-300
22 - 24	Small reel, thin tape	T-180 / DF-360
22 - 24	Small reel, thin tape	T-210 / DF-420
22 - 23	Large reel	T-5
23 - 24	Large reel	T-10
25 - 26	Large reel	T-20
27 - 29	Large reel	T-30
29 - 2B	Large reel	T-40
2D - 2F	Large reel	T-60

Note:
- ***The values of cassette tape type <2> in the above table are typical values with representative cassette tapes.***

SECTION 2
MECHANISM ADJUSTMENT

2.1 Before starting repair and adjustment

2.1.1 Precautions

(1) Unplug the power cord plug of the VCR before using your soldering iron.
(2) Take care not to cause any damage to the conductor wires when plugging and unplugging the connectors.
(3) Do not randomly handle the parts without identifying where the trouble is.
(4) Exercise enough care not to damage the lugs, etc. during the repair work.
(5) When reattaching the front panel assembly, make sure that the door opener of the cassette holder assembly is lowered in position prior to the reinstallation. (See SECTION 1 DISASSEMBLY.)
(6) When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). (See SECTION 1 DISASSEMBLY.)

2.1.2 Checking for proper mechanical operations

Enter the mechanism service mode when you want to operate the mechanism when no cassette is loaded. (See SECTION 1 DISASSEMBLY.)

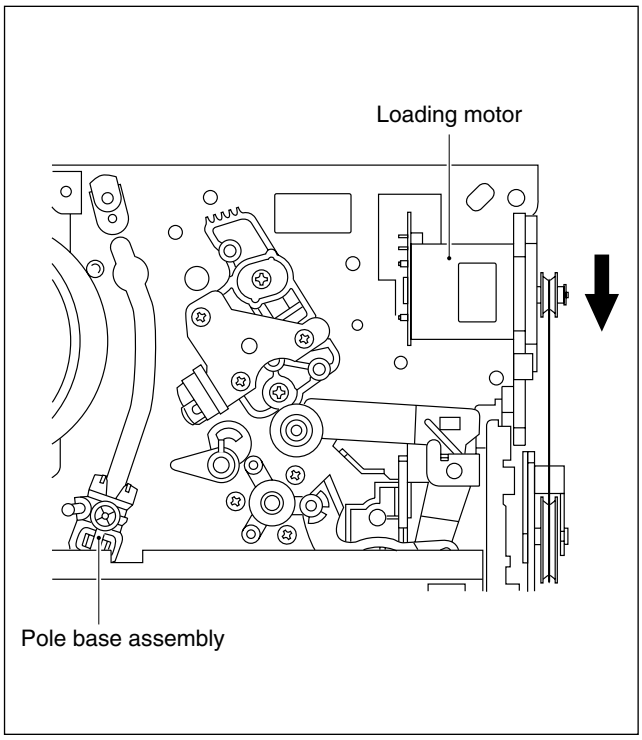


Fig. 2-1-3a

2.1.3 Manually removing the cassette tape

1. In case of electrical failures

If you cannot remove the cassette tape which is loaded because of any electrical failure, manually remove it by taking the following steps.

(1) Unplug the power cord plug from the power outlet.
(2) Refer to the disassembly procedure and perform the disassembly of the major parts before removing the drum assembly.
(3) Unload the pole base assembly by manually turning the loading motor of the mechanism assembly toward the front. In doing so, hold the tape by the hand to keep the slack away from any grease. (See Fig.2-1-3a.)
(4) Bring the pole base assembly to a pause when it reaches the position where it is hidden behind the cassette tape.
(5) Move the top guide toward the drum while holding down the lug (A) of the bracket retaining the top guide. Likewise hold part (B) down and remove the top guide.
Section (C) of the top guide is then brought under the cassette lid. Then remove the top guide by pressing the whole cassette tape down. (See Fig.2-1-3b.)
(6) Remove the cassette tape by holding both the slackened tape and the cassette lid.
(7) Take up the slack of the tape into the cassette. This completes removal of the cassette tape.

Note:

- ***For the disassembly procedure of the major parts and details of the precautions to be taken, see "SECTION 1 DISASSEMBLY".***

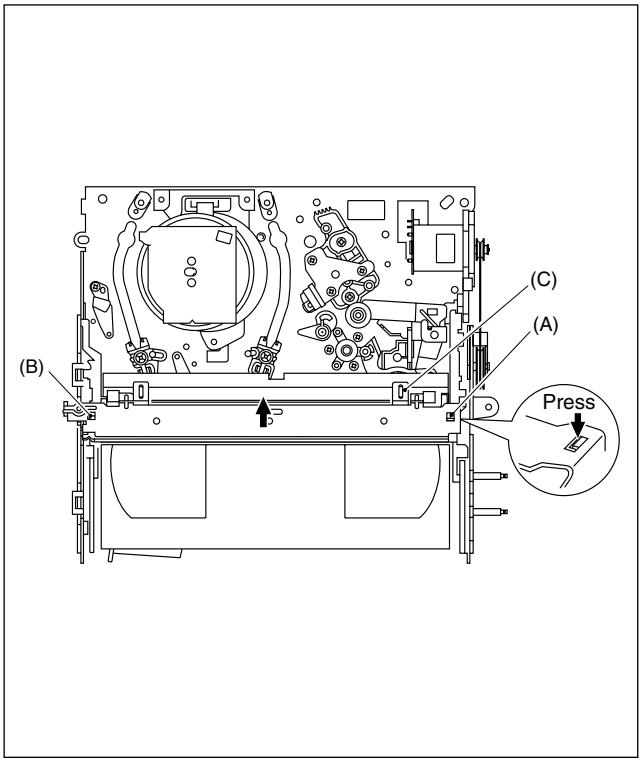


Fig. 2-1-3b

2. In case of mechanical failure

If you cannot remove the cassette tape which is loaded because of any mechanical failure, manually remove it by taking the following steps.

(1) Unplug the power cable and remove the top cover, front panel assembly and others so that the mechanism assembly is visible. (See SECTION 1 DASASSEMBLY.)
(2) While keeping the tension arm assembly of the mechanism assembly free from tension, pull the tape on the pole base assembly (supply or take-up side) out of the guide roller. (See Fig.2-1-3c.)
(3) Take the spring of the pinch roller arm assembly off the hook of the press lever assembly, and detach it from the tape. (See Fig.2-1-3d.)
(4) In the same way as in the electrical failure instructions in 2.1.3-1(5), remove the top guide.
(5) Raise the cassette tape cover. By keeping it in that position, draw out the cassette tape case from the cassette holder and take out the tape.
(6) By hanging the pinch roller arm assembly spring back on the hook, take up the slack of the tape into the cassette.

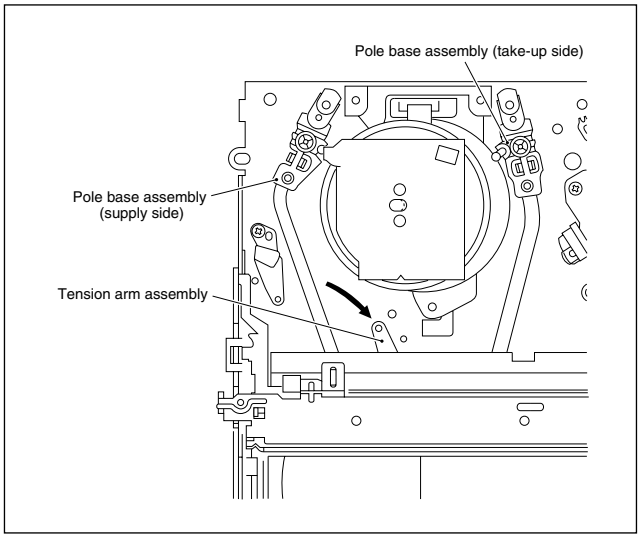


Fig. 2-1-3c

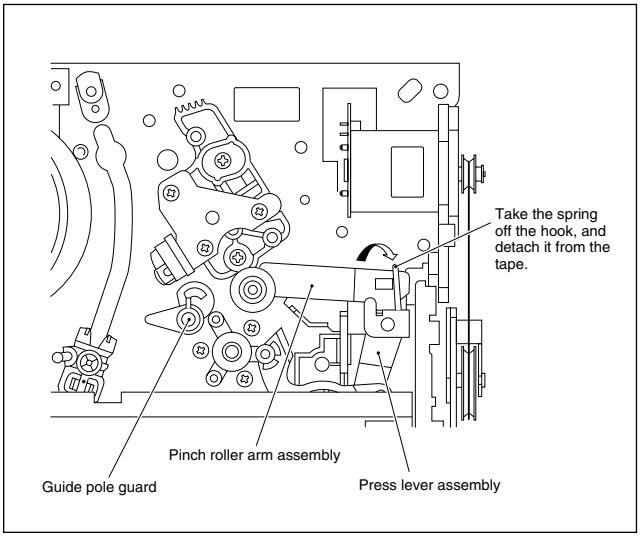
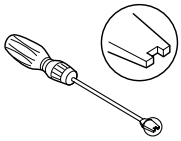
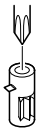
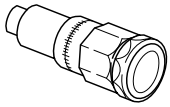
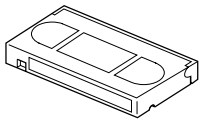
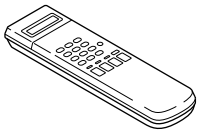
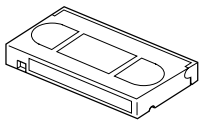
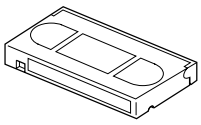


Fig. 2-1-3d

2.1.4 Jigs and tools required for adjustment

Roller driver PTU94002	A/C head positioning tool PTU94010	Torque gauge PUJ48075-2
		
Back tension cassette gauge PUJ48076-2	Jig RCU PTU94023B	
		
Alignment tape (SP, stairstep, NTSC) MHP	Alignment tape (EP, stairstep, NTSC) MHP-L	
		

2.1.5 Maintenance and inspection

1. Location of major mechanical parts

In this chapter, the two mechanism speeds are described by comparing the speeds of the standard type and the high-speed FF/REW type.
It is possible to distinguish between these two types of mechanism by the diameters of their capstan pulleys.
The capstan pulley diameter for the standard type is approx. 32 mm.
The capstan pulley diameter for the high-speed FF/REW type is approx. 43 mm.
For information on the different parts used in the two mechanism types, please refer to the “Replacement of major parts”.

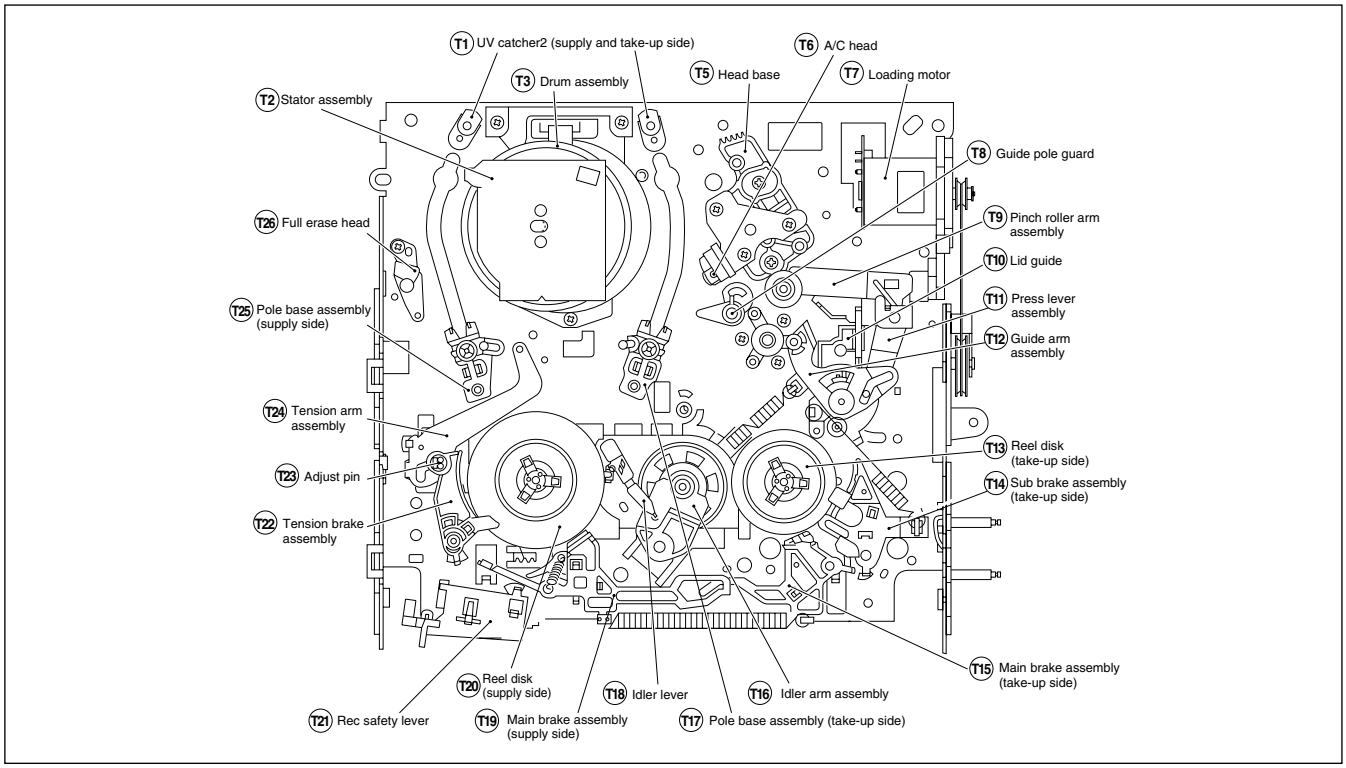

T1 UV catcher2 (supply and take-up side)
T6 A/C head
T3 Drum assembly
T5 Head base
T7 Loading motor
T2 Stator assembly
T8 Guide pole guard
T26 Full erase head
T9 Pinch roller arm assembly
T10 Lid guide
T25 Pole base assembly (supply side)
T11 Press lever assembly
T12 Guide arm assembly
T24 Tension arm assembly
T13 Reel disk (take-up side)
T23 Adjust pin
T14 Sub brake assembly (take-up side)
T22 Tension brake assembly
T15 Main brake assembly (take-up side)
T20 Reel disk (supply side)
T18 Idler lever
T16 Idler arm assembly
T21 Rec safety lever
T19 Main brake assembly (supply side)
T17 Pole base assembly (take-up side)

Fig. 2-1-5a Mechanism assembly top side

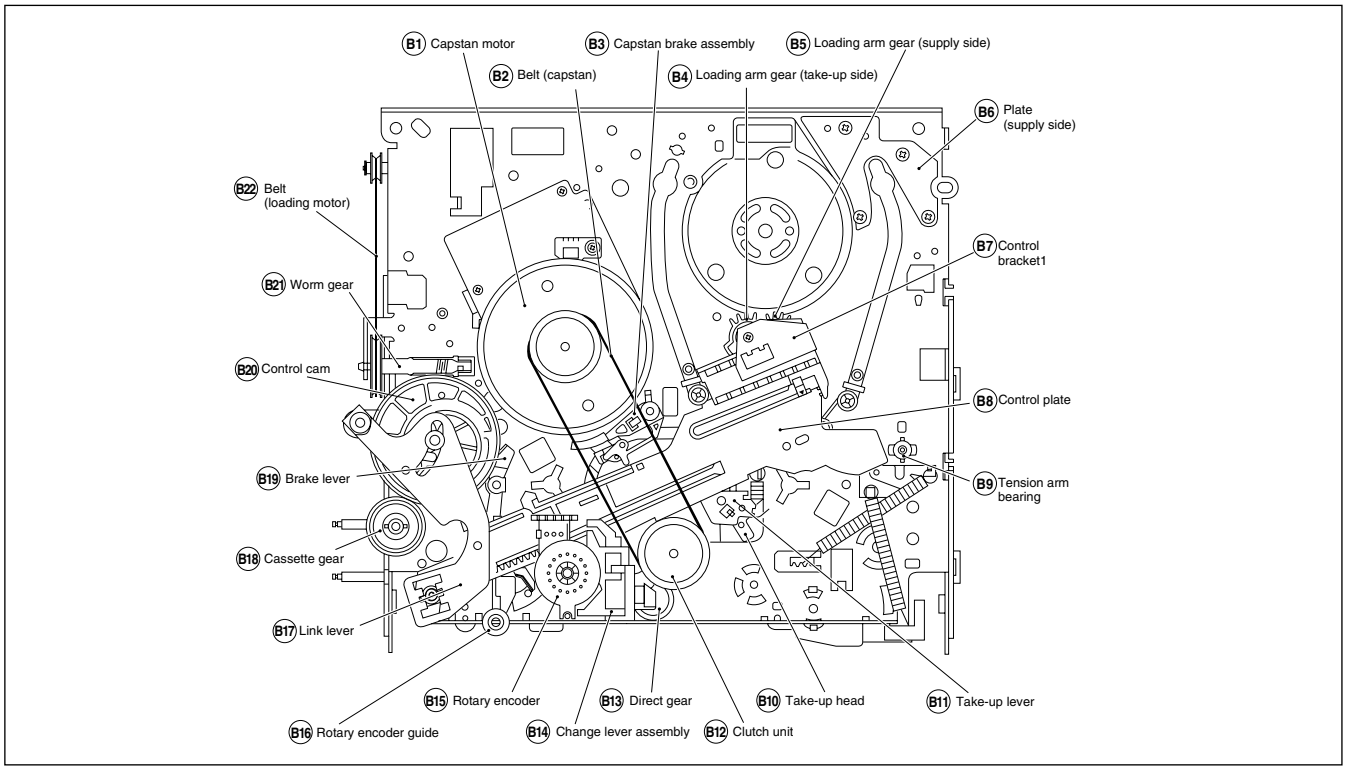


Fig. 2-1-5b Mechanism assembly bottom side

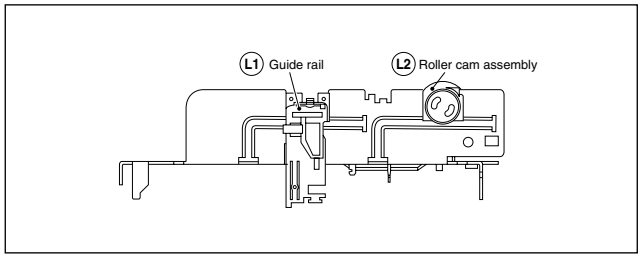


Fig. 2-1-5c Mechanism assembly left side

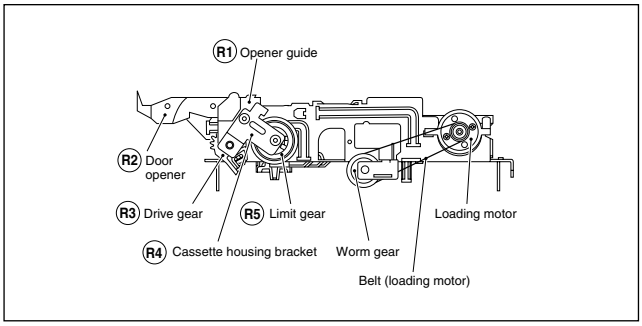


Fig. 2-1-5d Mechanism assembly right side

2. Cleaning

Regular cleaning of the transport system parts is desirable but practically impossible. So make it a rule to carry out cleaning of the tape transport system whenever the machine is serviced.

When the video head, tape guide and/or brush get soiled, the playback picture may appear inferior or at worst disappear, resulting in possible tape damage.

(1) When cleaning the upper drum (especially the video head), soak a piece of closely woven cloth or Kimu-wipe with alcohol and while holding the cloth onto the upper drum by the fingers, turn the upper drum counterclockwise.

Note:

- ***Absolutely avoid sweeping the upper drum vertically as this will cause damage to the video head.***

(2) To clean the parts of the tape transport system other than the upper drum, use a piece of closely woven cloth or a cotton swab soaked with alcohol.

(3) After cleaning, make sure that the cleaned parts are completely dry before using the video tape.

3. Lubrication

With no need for periodical lubrication, you have only to lubricate new parts after replacement. If any oil or grease on contact parts is soiled, wipe it off and newly lubricate the parts.

Note:

- ***See the "mechanism assembly" diagram of the parts list for the lubricating or greasing spots, and for the types of oil or grease to be used.***

4. Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning,lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions.However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time,even if the set is not used.

System	Parts Name	Operation Hours	
		~1000H	~2000H
Tape transport	Upper drum assembly	★○	○
	A/C head	★○	★○
	Lower drum assembly	★	★○
	Pinch roller arm assembly	★	★
	Full erase head	★	★
	Tension arm assembly	★	★
	Capstan motor (Shaft)	★	★
	Guide arm assembly	★	★
Drive	Capstan motor		○
	Capstan brake assembly		○
	Main brake assembly		○
	Belt (Capstan)	○	○
	Belt (Loading motor)		○
	Loading motor		○
	Clutch unit		○
	Worm gear		○
	Control plate		○
Other	Brush	★○	★○
	Tension brake assembly	○	○
	Rotary encoder		○

★ : Cleaning

○ : Inspection or replacement if necessary

Table 2-1-5a

5. Disassembling procedure table

The following table indicates the order in which parts are removed for replacement. To replace parts, remove them in the order of 1 to 18 as shown in the table. To install them, reverse the removal sequence.

The symbols and numbers preceding the individual part names represent the numbers in the "Location of major mechanical parts" table. Also, the "T", "B", and "T/B" on the right of each part name shows that the particular part is removed from the front, from the back, and from both sides of the mechanism, respectively.

Symbols and numbers	Removal parts / (Reference items) Replacement parts	Front (T)/Back (B) of mechanism	Number of removal steps	L1 Guide rail	L2 Roller cam assembly	R4 Cassette housing bracket	R1 Opener guide	— Relay gear	— Cassette holder assembly	R3 Drive gear	— Drive arm	T9 Pinch roller arm assembly	T12 Guide arm assembly	T11 Press lever assembly	T1 UV catcher2	B15 Rotary encoder	B12 Clutch unit	B14 Change lever assembly	B13 Direct gear	— Clutch gear	B17 Link lever	B21 Worm gear	B7 Control bracket1	B8 Control plate	B5 Loading arm gear (supply side)	B4 Loading arm gear (take-up side)	B11 Take-up lever	T14 Sub brake assembly (take-up side)	T15 Main brake assembly (take-up side)	T13 Reel disk (take-up side)	T22 Tension brake assembly	T24 Tension arm assembly	T18 Idler lever	B19 Brake lever (*1)
L1	2.2.3 Guide rail	T	1																															
L2	2.2.3 Roller cam assembly	T	1																															
R4	2.2.3 Cassette housing bracket	T	1																															
R1	2.2.3 Opener guide	T	2			1																												
R2	2.2.3 Door opener	T	3			1	2																											
—	2.2.3 Relay gear	T	3			1	2																											
R5	2.2.3 Limit gear	T	3			1	2																											
—	2.2.3 Cassette holder assembly	T	6	1	2	3	4	5																										
R3	2.2.3 Drive gear	T	4			1	2	3																										
—	2.2.3 Drive arm	T	8	1	2	3	4	5	6	7																								
T9	2.2.4 Pinch roller arm assembly	T	1																															
T12	2.2.5 Guide arm assembly	T	1																															
T11	2.2.5 Press lever assembly	T	3									1	2																					
T6	2.2.6 A/C head	T	1																															
T7	2.2.7 Loading motor	T	1																															
B1	2.2.8 Capstan motor	T/B	1																															
T1	2.2.9 UV catcher2	T	1																															
T17	2.2.9 Pole base assembly (take-up side)	T/B	2												1																			
T25	2.2.9 Pole base assembly (supply side)	T/B	2												1																			
B15	2.2.10 Rotary encoder	B	1																															
B12	2.2.11 Clutch unit	B	1																															
B14	2.2.12 Change lever assembly	B	3													1	2																	
B13	2.2.12 Direct gear	B	4													1	2	3																
—	2.2.12 Clutch gear	B	5													1	2	3	4															
—	2.2.12 Coupling gear	B	6													1	2	3	4	5														
B17	2.2.13 Link lever	B	1																															
B18	2.2.14 Cassette gear	B	2																		1													
B20	2.2.14 Control cam	B	2																		1													
B21	2.2.14 Worm gear	B	1																															
T10	- Lid guide	T/B	5									1	2	3								4												
B7	2.2.15 Control bracket1	B	1																															
B8	2.2.15 Control plate	B	6													1	2	3			4		5											
B5	2.2.16 Loading arm gear (supply side)	B	7													1	2	3			4		5	6										
B4	2.2.16 Loading arm gear (take-up side)	B	8													1	2	3			4		5	6	7									
—	2.2.16 Loading arm gear shaft	B	9													1	2	3			4		5	6	7	8								
B11	2.2.17 Take-up lever	T/B	7													1	2	3			4		5	6										
B10	2.2.17 Take-up head	T/B	8													1	2	3			4		5	6			7							
—	2.2.17 Control plate guide	T/B	8													1	2	3			4		5	6			7							
B3	2.2.18 Capstan brake assembly	T/B	7													1	2	3			4		5	6										
T14	2.2.19 Sub brake assembly(take-up side)	T/B	15	1	2	3	4	5	6	7	8					9	10	11			12		13	14										
T15	2.2.20 Main brake assembly(take-up side)	T/B	16	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15						
T19	2.2.20 Main brake assembly(supply side)	T/B	9	1	2	3	4	5	6	7	8																							
T13	2.2.20 Reel disk (take-up side)	T/B	16	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15						
T22	2.2.21 Tension brake assembly	T/B	9	1	2	3	4	5	6	7	8																							
T20	2.2.21 Reel disk (supply side)	T/B	10	1	2	3	4	5	6	7	8																					9		
T24	2.2.21 Tension arm assembly	T/B	10	1	2	3	4	5	6	7	8																					9		
B9	2.2.21 Tension arm bearing	T/B	10	1	2	3	4	5	6	7	8																					9		
T18	2.2.22 Idler lever	T/B	17	1	2	3	4	5	6	7	8					9	10	11			12		13	14								15	16	
T16	2.2.22 Idler arm assembly	T/B	18	1	2	3	4	5	6	7	8					9	10	11			12		13	14								15	16	17
B19	- Brake lever (*1)	T/B	18	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15	16	17				
B16	- Rotary encoder guide	T/B	19	1	2	3	4	5	6	7	8					9	10	11			12		13	14				15	16	17				18

Table 2-1-5b

Note:

- ***The parts with marked (∗) have different types of mechanisms (standard type or high-speed FF/REW type).***
  - ***∗ 1 : Uses the standard type mechanism only.***
  - ***∗ 2 : Uses the high-speed FF/REW type mechanism only.***

2.2 Replacement of major parts

2.2.1 Before starting disassembling (Phase matching between mechanical parts)

The mechanism of this unit is closely linked with the rotary encoder and system controller circuits.
Since the system controller detects the status of mechanical operation in response to phases of the rotary encoder (internal switch positions), the mechanism may not operate properly unless such parts as the rotary encoder, control plate, loading arm gear, control cam, cassette gear, limit gear, relay gear and drive gear are installed in their correct positions.
Especially, this model is not provided with any cassette housing assembly, so that cassette loading and unloading must be accomplished by operation of the cassette holder assembly. The latter is in turn driven by such parts as the drive gear, relay gear and limit gear. Exercise enough care, therefore, to have the phases of all this gear matching one another. (For information on phase matching of the mechanism, see the instructions on how to install individual parts.)
This unit is provided with a mechanism assembly mode. It is therefore necessary to enter this mode for assembling and disassembling procedures.
This mode is usually not in use, manually set it when it is required.

2.2.2 How to set the "Mechanism assembling mode"

Remove the mechanism assembly and place it bottom side up. (See SECTION 1 DISASSEMBLY.) Turn the worm gear toward the front so that the guide hole of the control cam is brought into alignment with the hole at the mechanism assembly chassis. This position renders the mechanism assembling mode operational. Make sure that the control plate is located in alignment with the mark E. (See Fig.2-2-2a.)

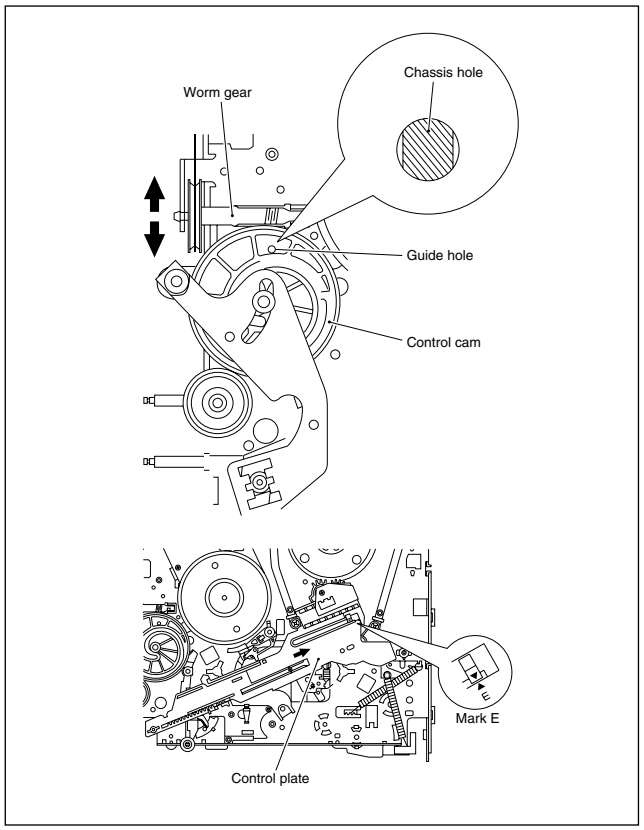


Fig. 2-2-2a

2.2.3 Cassette holder assembly

1. How to remove

(1) Remove the guide rail and roller cam assembly. (See Fig.2-2-3a.)
(3 lugs on the guide rail and one lug on the roller cam assembly)

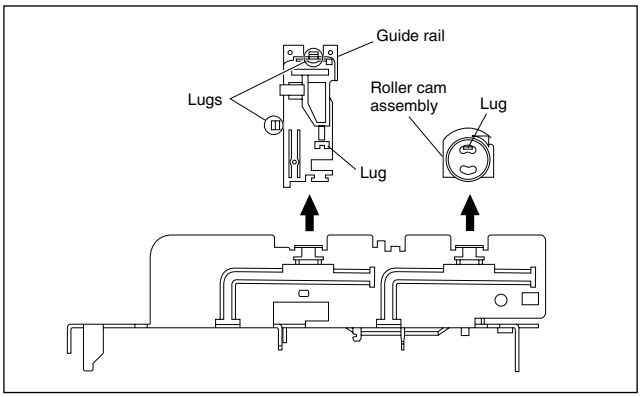


Fig. 2-2-3a

(2) Remove the two slit washers and remove the cassette housing bracket. (See Fig.2-2-3b.)
(3) Remove the opener guide, spring(A), door opener, relay gear and limit gear. (See Fig.2-2-3b.)

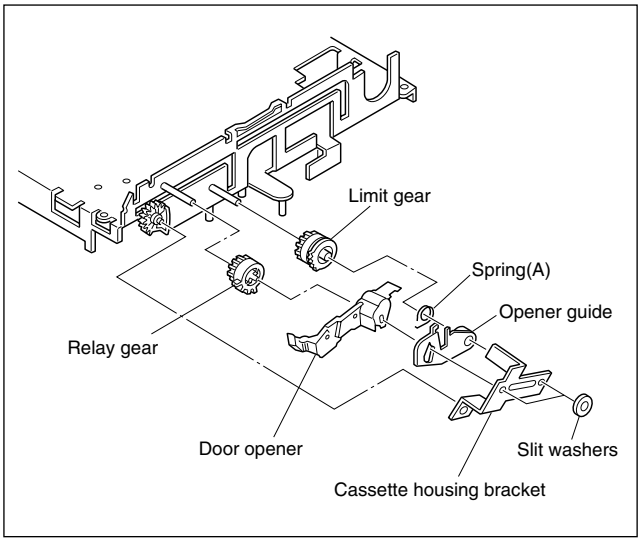


Fig. 2-2-3b

(4) While swinging the lock levers (R) and (L) of the cassette holder assembly toward the front, slide the cassette holder assembly until its legs come to where the guide rail and the roller cam assembly have been removed (so that the drive arm is upright). (See Fig.2-2-3c.)

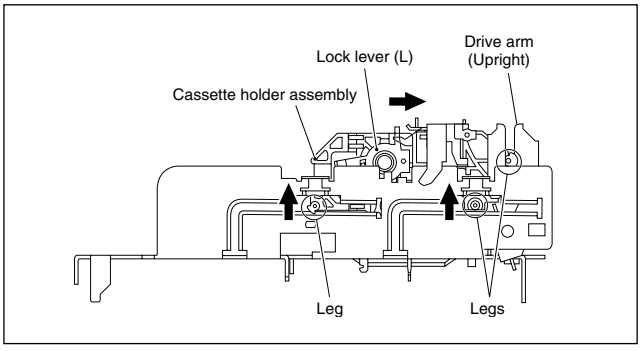


Fig. 2-2-3c

(5) While holding the left side of the cassette holder, lift the cassette holder assembly so that the three legs on the left side are all released. Then pull the legs (A) and (B) on the right side out of the rail and also pull up the leg(C). (See Fig.2-2-3d and Fig.2-2-3e.)
(6) Draw out the drive gear, and remove the drive arm.

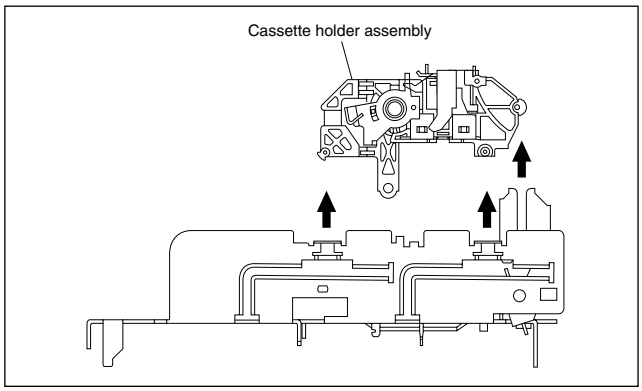


Fig. 2-2-3d

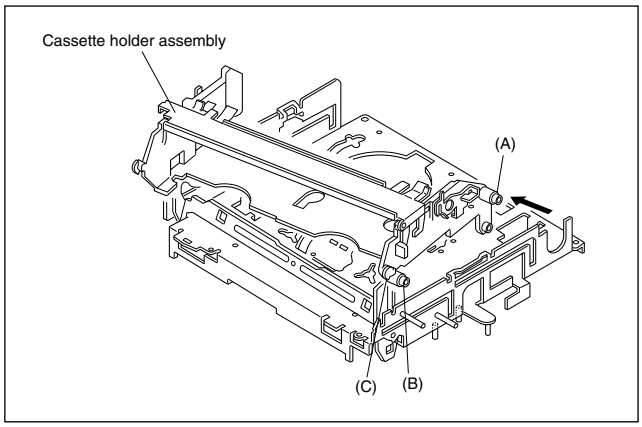


Fig. 2-2-3e

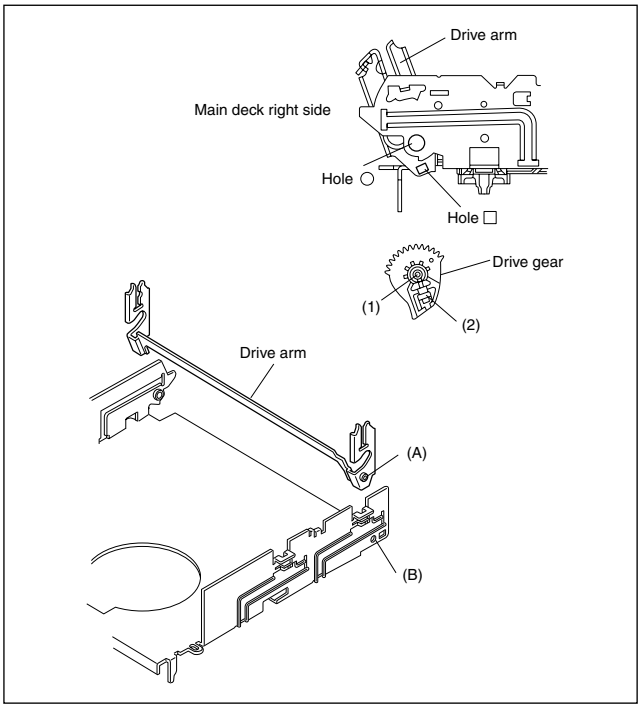


Fig. 2-2-3f

2. How to install (Phase matching)

(1) Insert the section (A) of the drive arm into the section (B) of the main deck.
(2) Insert the section (1) of the drive gear into the round hole, and the section (2) into the square hole on the drive arm. (See Fig.2-2-3f.)
(3) Hold the drive arm upright and fit the leg (C) on the right side of the cassette holder assembly into the groove. (See Fig.2-2-3g.)
(4) While swinging the lock lever (R) of the cassette holder assembly toward the front, put the legs (A) and (B) into the rail. (See Fig.2-2-3g.)
(5) Drop the three legs on the left side of the cassette holder assembly into the groove at one time. (See Fig.2-2-3h.)
(6) Slide the whole cassette holder assembly toward the front to bring it to the eject end position.
(7) Install the limit gear so that the notch on the outer circumference of the limit gear is brought into alignment with the guide hole on the main deck. (See Fig.2-2-3i.)
(8) Install so that the notch on the periphery of the relay gear is aligned with the notch of the main deck and that hole A of the relay gear is aligned with the hole A of the limit gear and that hole B of the relay gear is aligned with the hole B of the drive gear. (See Fig.2-2-3i.)
(9) Install the door opener, opener guide, spring(A) and cassette housing bracket and fasten the two slit washers.

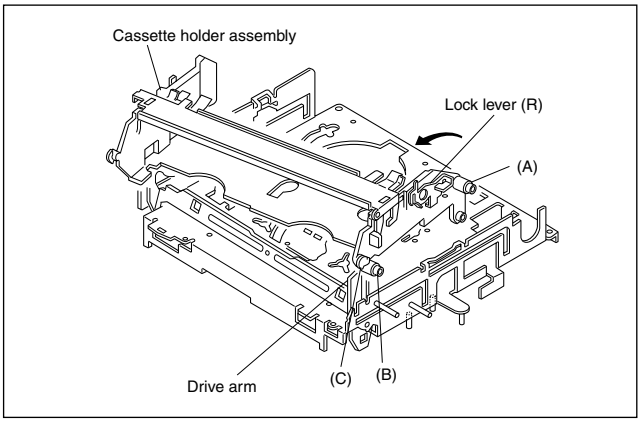


Fig. 2-2-3g

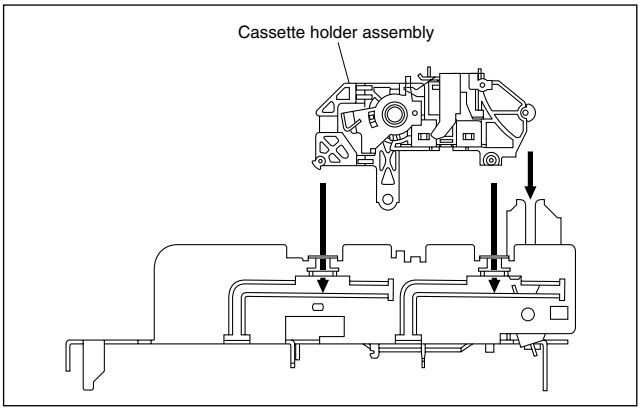


Fig. 2-2-3h

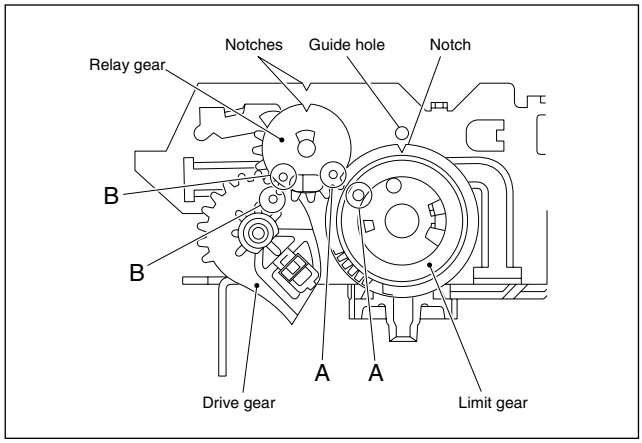


Fig. 2-2-3i

2.2.4 Pinch roller arm assembly

1. How to remove

(1) Remove the spring from the hook of the press lever assembly.
(2) Remove the slit washer and remove the pinch roller seat 2. (See Fig.2-2-4a.)
(3) Remove the pinch roller arm assembly by pulling it up.

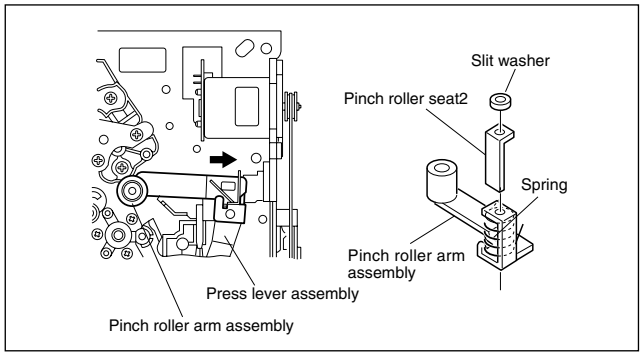


Fig. 2-2-4a

2.2.5 Guide arm assembly and press lever assembly

1. How to remove

(1) Remove the spring and expand the lug of the lid guide in the arrow-indicated direction. Then remove the guide arm assembly by pulling it up.
(2) Remove the press lever assembly by pulling it up. (See Fig.2-2-5a.)

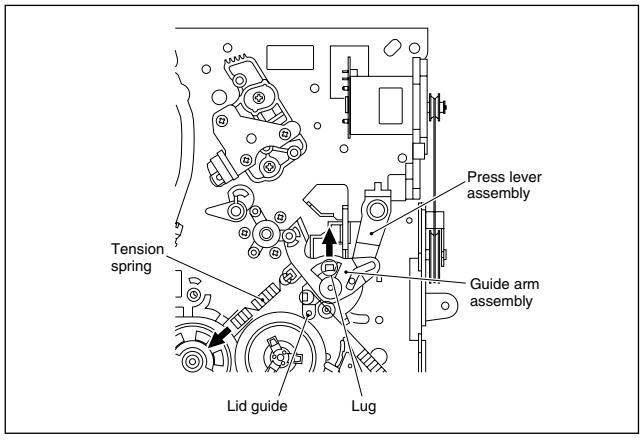


Fig. 2-2-5a

2.2.6 A/C head

1. How to remove

(1) Remove the two screws (A) and remove the A/C head together with the head base.
(2) When replacing only the A/C head, remove the three screws (B) while controlling the compression spring.

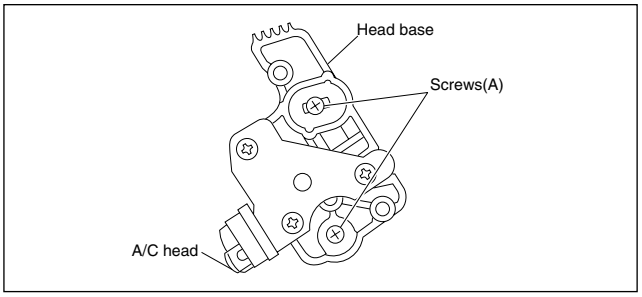


Fig. 2-2-6a

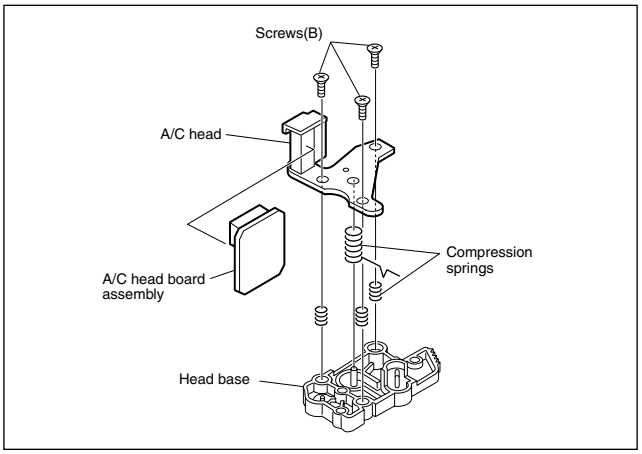


Fig. 2-2-6b

2. How to install

(1) To make the post-installation adjustment easier, set the temporary level as indicated in Fig.2-2-6c. Also make sure that the screw center (centre) is brought into alignment with the center (centre) position of the slot.

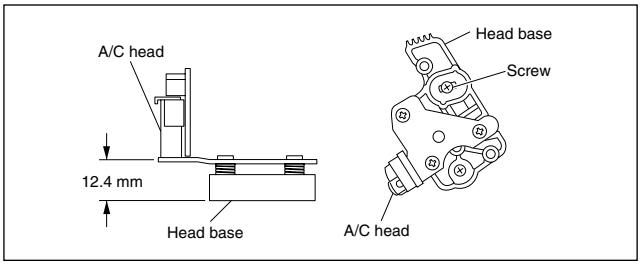


Fig. 2-2-6c

2.2.7 Loading motor

1. How to remove

(1) Remove the belt wound around the worm gear.
(2) Open the two lugs of the motor guide and remove the loading motor, loading motor board assembly and motor guide altogether by pulling them up.
(3) When replacing the loading motor board assembly, take care with the orientation of the loading motor. (Install so that the loading motor label faces upward.)
(4) When the motor pulley has been replaced, choose the fitting dimension as indicated in Fig.2-2-7a.

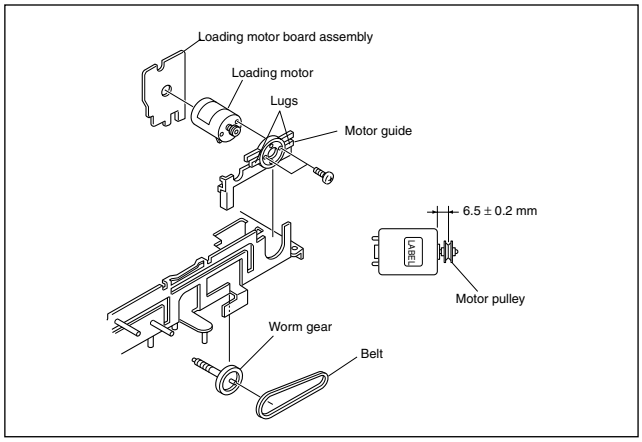


Fig. 2-2-7a

2.2.8 Capstan motor

1. How to remove

(1) Remove the belt (capstan) on the mechanism assembly back side.
(2) Remove the three screws (A) and remove the capstan motor.

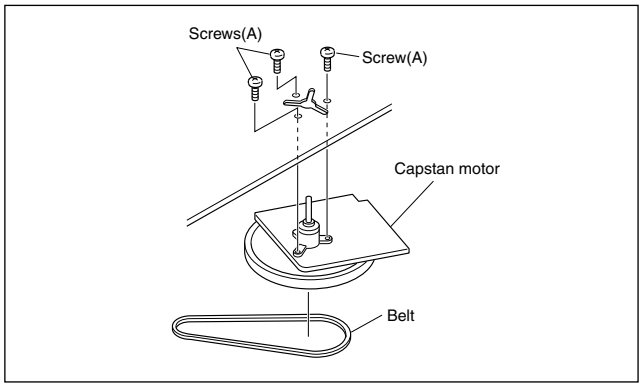


Fig. 2-2-8a

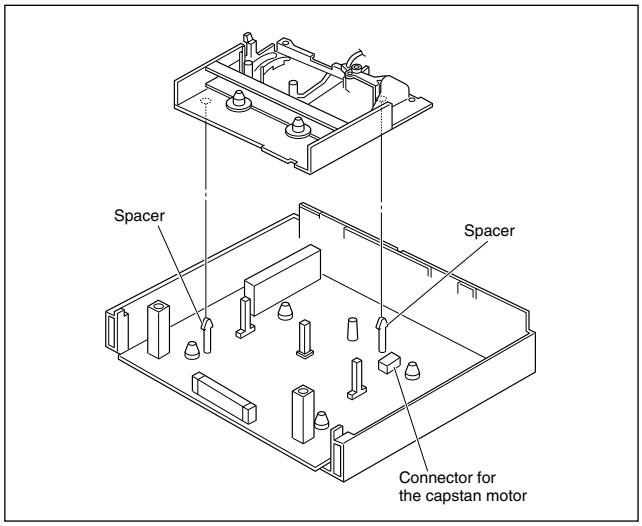


Fig. 2-2-8b

2. How to install (Centering the mounting position)

When the capstan motor has once been removed and then reinstalled out of the initial correct position in the rotational direction, the capstan motor current may be unstable during operation in high or low temperatures. This may result in greater Wow & Flutter and occasionally in power breakdown because of current over - load. Install the capstan motor while following the procedure given below.
(The capstan motor is centrally located when the unit is shipped from the factory.)

(1) Provisionally tighten the three screws (A) securing the capstan motor.
(2) Install the mechanism assembly to which the capstan motor is provisionally fastened on the bottom chassis which incorporates the Main board assembly. (No need to tighten the screws for mounting the mechanism.)
Make sure that all the connectors for the mechanism assembly and the Main board assembly are correctly installed as indicated in Fig. 2-2-8b.
(3) Making sure that the connector for the capstan motor is correctly mounted, and securely tighten the three screws (A).

Note:

- ***When the capstan motor has been replaced with a new one, perform recording in the EP(or LP) mode for at least 2 minutes at normal temperatures immediately before starting the FF/REW or SEARCH operations (Aging).***

2.2.9 Pole base assembly (supply or take-up side)

1. How to remove

(1) Remove the UV catcher 2 on the removal side by loosening the screw (A).
(2) Remove the pole base assembly on the supply side from the mechanism assembly by loosening the screw (B) on the mechanism assembly back side and sliding the pole base assembly toward the UV catcher 2.
(3) As for the pole base assembly on the take-up side, turn the pulley of the loading motor to lower the cassette holder because the screw (B) is hidden under the control plate. (See the “Procedures for Lowering the Cassette holder assembly” of 1.3 DISASSEMBLY/ASSEMBLY METHOD.) Further turn the motor pulley to move the cassette holder until the screw (B) is no longer under the control plate (in the half-loading position). Then remove it as done for the supply side by removing the screw (B).

Note:

- ***After reinstalling the Pole base assembly and the UV catcher2, be sure to perform compatibility adjustment.***

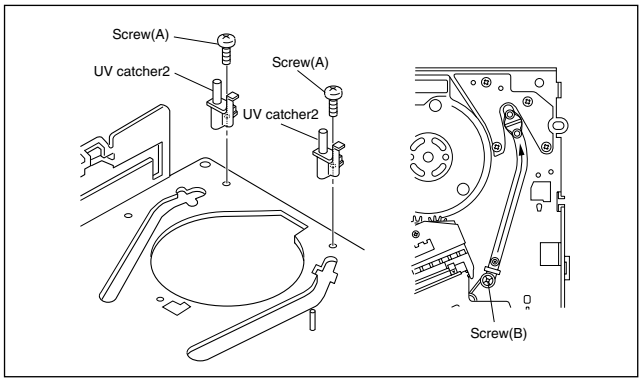


Fig. 2-2-9a

2.2.10 Rotary encoder

1. How to remove

(1) Remove the screw (A) and remove the rotary encoder by pulling it up. (See Fig. 2-2-10a.)

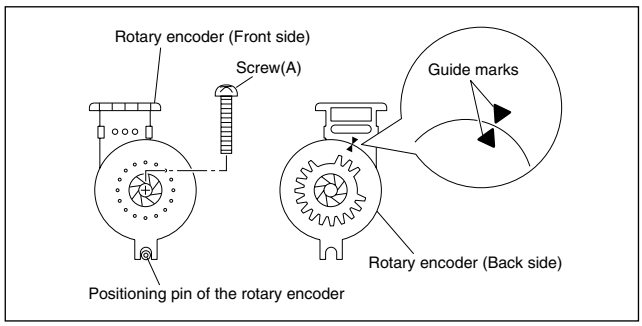


Fig. 2-2-10a

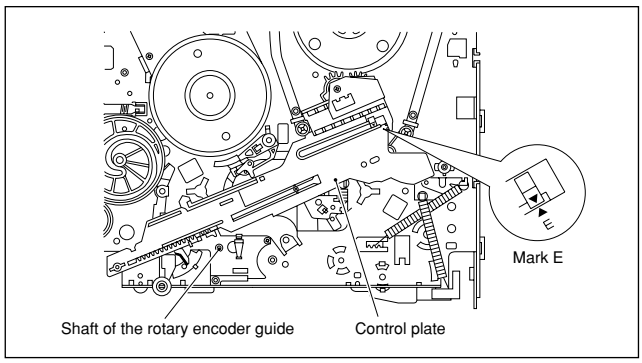


Fig. 2-2-10b

2. How to install (Phase matching)

(1) Make sure that the mark E of the control plate is in alignment with the mark ▼ of the loading arm gear shaft and bring the guide marks on the rotary encoder into alignment as indicated in Fig.2-2-10a. (See Fig. 2-2-10a and Fig. 2-2-10b.)

(2) Turn over the rotary encoder with its guide marks kept in alignment and install it by fitting on the shaft of the rotary encoder guide and the positioning pin.

(3) Tighten the screw (A) to complete the installation.

2.2.11 Clutch unit

(1) Remove the belt wound around the capstan motor and the clutch unit.

(2) Remove the slit washer and remove the clutch unit.

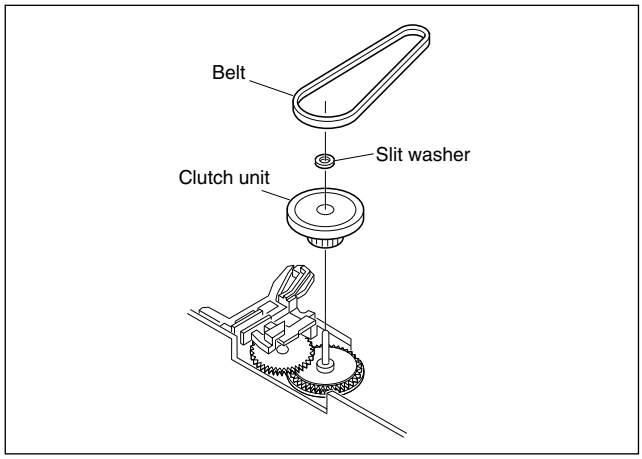


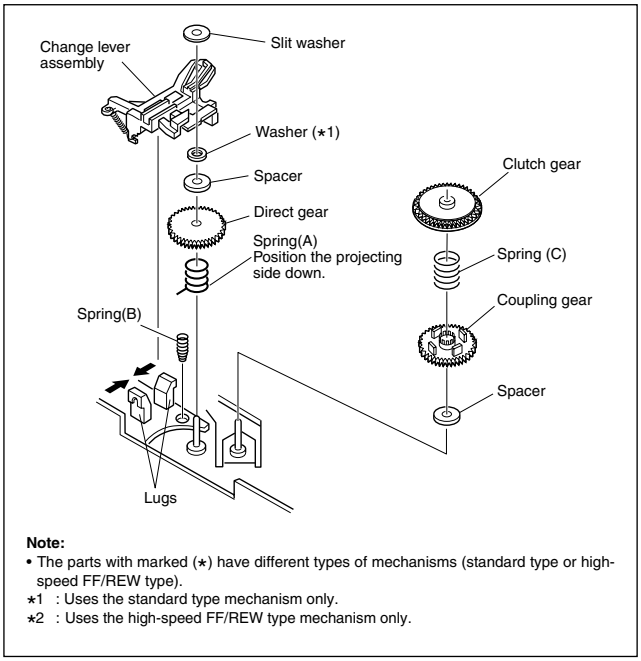
Fig. 2-2-11a

2.2.12 Change lever assembly, direct gear, clutch gear and coupling gear

1. How to remove

(1) Release the two lugs of the rotary encoder guide in the arrow-indicated direction and remove the change lever assembly.

(2) Remove the slit washer retaining the direct gear and remove the latter.
Take care so as not to lose the washer and spring. (See Fig.2-2-12a.)



Note:
- The parts with marked (*) have different types of mechanisms (standard type or high-speed FF/REW type).

*1 : Uses the standard type mechanism only.
*2 : Uses the high-speed FF/REW type mechanism only.

Fig. 2-2-12a

2. How to install

(1) Install the clutch gear, spring (A), spring (C), direct gear, spacer and others to the individual shafts of the main deck, and finally the slit washer. (See Fig.2-2-12a.)

(2) Let the spring (B) drops into the rotary encoder guide hole and install the change lever assembly.(Take care not to mistake a direction of the spring.) The point is to slightly lift the clutch gear and catch it from the both sides with the assembly. (See Fig.2-2-12b.)

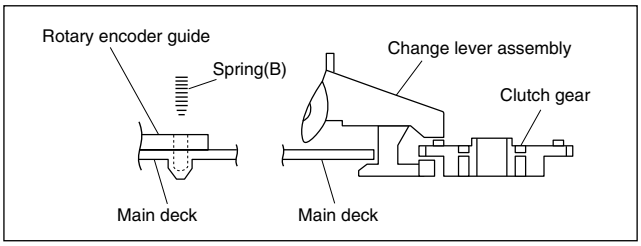


Fig. 2-2-12b

2.2.13 Link lever

1. How to remove

(1) Remove the two slit washers.
(2) Remove the link lever by lifting it from the shaft retained by the slit washers. Then swing the link lever counterclockwise and remove it from the locking section of the control plate.

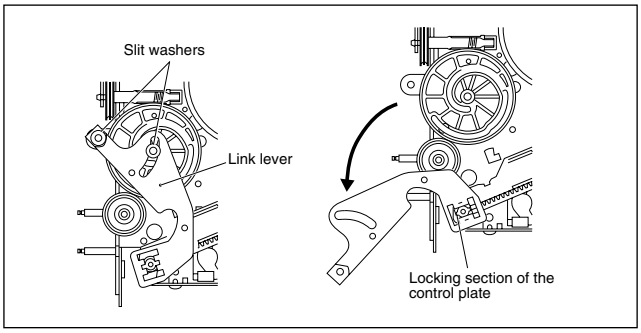


Fig. 2-2-13a

2. How to install (Phase matching)

(1) Slide the control plate so that its mark E is aligned with the mark ▼ on the loading arm gear shaft. (See Fig.2-2-13b.)
(2) Rotate the worm gear until the guide hole of the control cam is aligned exactly with the guide hole of the main deck. (See Fig.2-2-13c.)
(3) Insert the link lever into the locking section of the control plate. (See Fig.2-2-13a.)
(4) Rotate the link lever clockwise so that it is installed on the shafts in the center (centre) and on the left of the control cam.
(5) Fasten the slit washers at these two points.

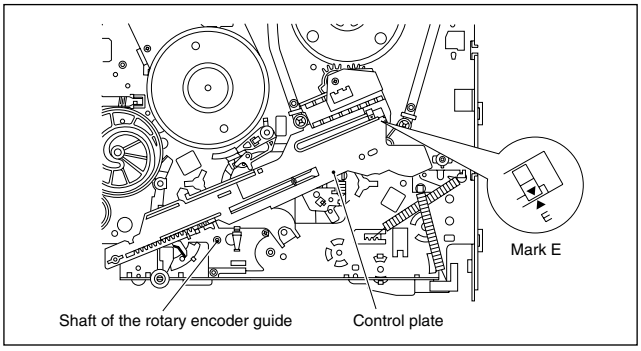


Fig. 2-2-13b

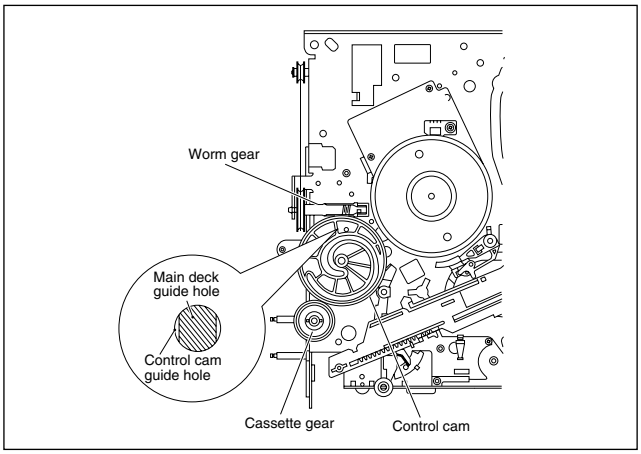


Fig. 2-2-13c

2.2.14 Cassette gear, control cam and worm gear

1. How to remove

(1) Remove the control cam by lifting it.
(2) Open the two lugs of the cassette gear outward and pull the latter off.
(3) Remove the belt wound around the worm gear and the loading motor.
(4) Open the lug of the lid guide outward and remove the worm gear.

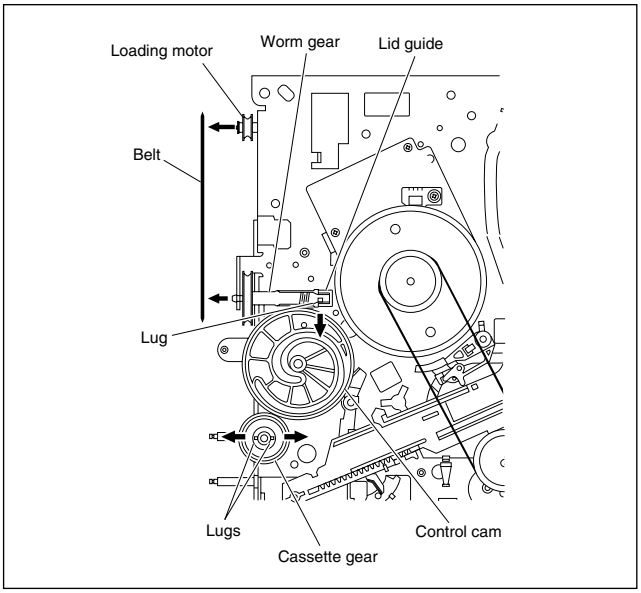


Fig. 2-2-14a

2.2.15 Control plate

1. How to remove

(1) Remove the screw (A) retaining the control bracket 1 and remove the latter.
(2) Slide the control plate as indicated by the arrow and remove the control plate. (See Fig.2-2-15a.)

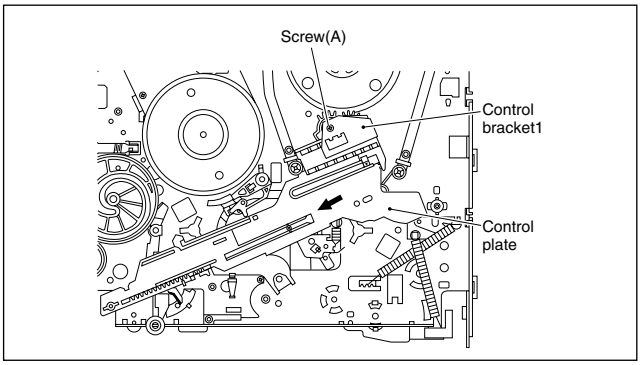


Fig. 2-2-15a

2. How to install (Phase matching)

(1) Adjust the position of the idler arm assembly pin as indicated in Fig.2-2-15b (to the left of center (centre) of the R section).
(2) Bring the guide hole of the take-up lever into alignment with the hole at the control plate guide and fix the position by inserting a 1.5 mm hexagonal wrench.

(3) Install the control plate so that the section A of the loading arm gear shaft fits into the hole (A) of the control plate, the section B of the control plate guide into the hole (B), and the control plate comes under the section C of the rotary encoder guide and the section D of the loading arm gear shaft while press-fit the pole base assmebly (supply side) as indicated by the arrow. It is important that the tension arm assembly shaft is positioned closer toward you than the control plate. (See Fig.2-2-15c.)
(4) Make sure that the mark E of the control plate is in alignment with the mark ▼ of the loading arm gear shaft. (See Fig.2-2-15c.)
(5) Pull off the hexagonal wrench for positioning.

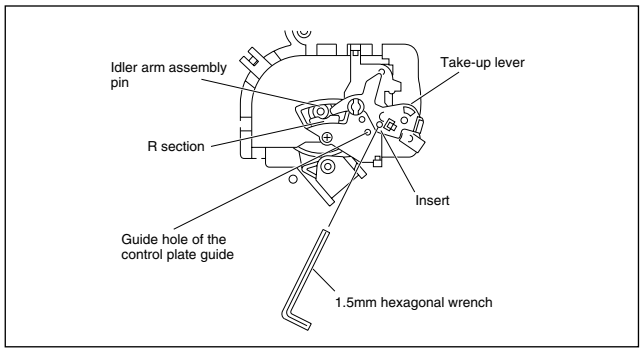


Fig. 2-2-15b

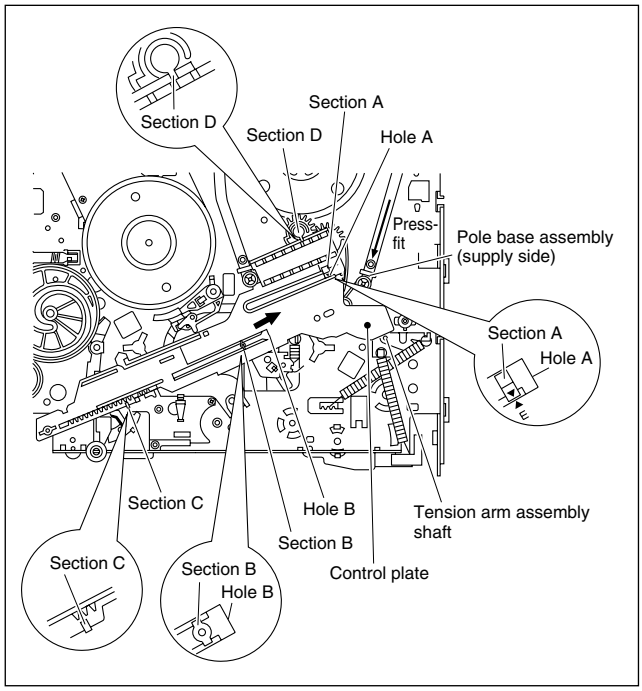


Fig. 2-2-15c

2.2.16 Loading arm gear (supply or take-up side) and loading arm gear shaft

1. How to remove

(1) Remove the loading arm gear (supply side) by loosening the screw (A). (See Fig. 2-2-16a.)
(2) Remove the screw (B) and remove the torsion arm from the pole base assembly (take-up side). (See Fig.2-2-16a.)
(3) Turn the loading arm gear (take-up side) clockwise so that the notch of the loading arm gear (take-up side) is in alignment with the projection of the loading arm gear shaft and lift it.
Likewise, turn the loading arm counterclockwise so that the notch is in alignment with the projection and remove the loading arm gear (take-up side). (See Fig.2-2-16a and Fig. 2-2-16b.)
(4) When removing the loading arm gear shaft, be sure of first removing the screw retaining the drum assembly (on the back side of the loading arm gear shaft). Then remove the screw (C) and remove the loading arm gear shaft by sliding it.

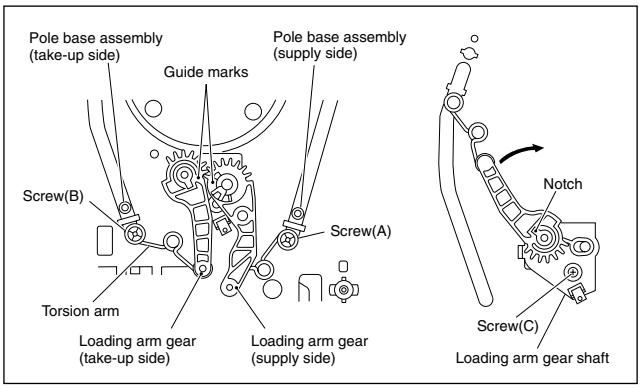


Fig. 2-2-16a

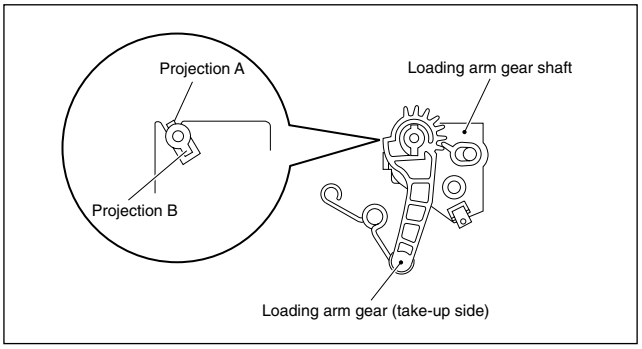


Fig. 2-2-16b

2. How to install

(1) Align the notch of the loading arm gear (take-up side) to the projection B of the loading arm gear shaft and slip it over. Then rotate it clockwise for alignment with the projection A and slip it down to the bottom. (See Fig.2-2-16b.)
(2) Then turn the loading arm gear (take-up side) counterclockwise. Hang the torsion arm on the pole base assembly (take-up side) and tighten the screw (B).
(3) Install the loading arm gear (supply side) so that the guide mark of the loading arm gear (take-up side) is in alignment with the guide mark of the loading arm gear (supply side). Then hang the torsion arm on the pole base assembly (supply side) and tighten the screw (A). (See Fig.2-2-16a.)

2.2.17 Take-up lever, take-up head and control plate guide

(1) Remove the spring of the take-up lever from the main deck.
(2) Remove the lug (A) of the take-up lever from the main deck and pull out the take-up lever and the take-up head together.
(3) Remove the screw (A).
(4) Align the idler arm assembly pin in the center (centre) of the R section of the control plate guide, remove the control plate guide lugs (B) and (C) from the main deck, and remove the control plate guide.

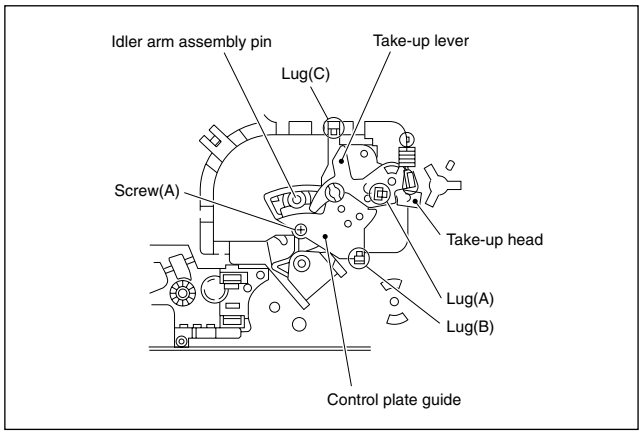


Fig. 2-2-17a

2.2.18 Capstan brake assembly

1. How to remove

(1) Move the lug (A) of the capstan brake assembly in the arrow-indicated direction so that it comes into alignment with the notch of the main deck. (See Fig. 2-2-18a.)
(2) Remove the lug (B) of the capstan brake assembly from the main deck and remove the capstan brake assembly.

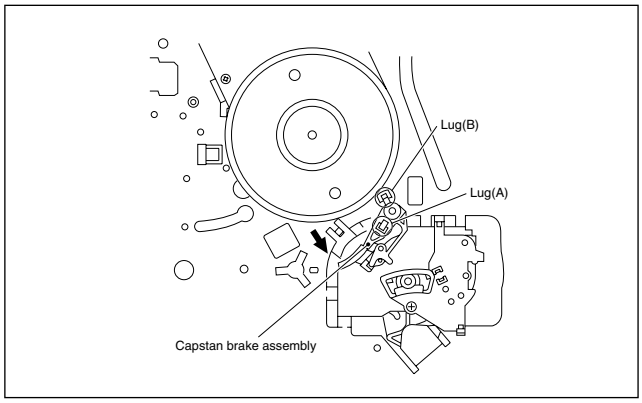


Fig. 2-2-18a

2.2.19 Sub brake assembly (take-up side)

1. How to remove

(1) Remove the spring attached to the lid guide and sub brake assembly (take-up side).
(2) Bring the lug (A) of the sub brake assembly (take-up side) into alignment with the notch of the main deck.
(3) Remove the lugs (B) and (C) of the sub brake assembly (take-up side) from the main deck and remove the sub brake assembly (take-up side).

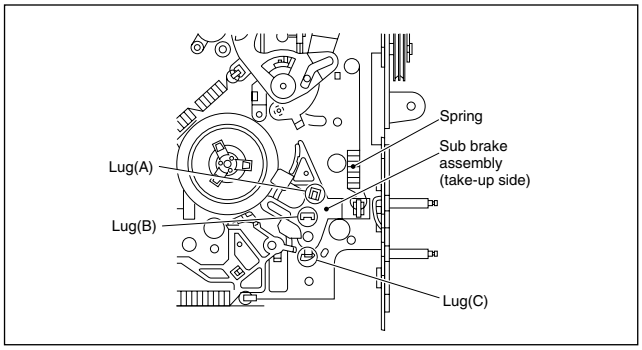


Fig. 2-2-19a

2.2.20 Main brake assembly (take-up side), reel disk (take-up side) and main brake assembly (supply side)

1. How to remove

(1) Move the main brake assembly (take-up side) in the arrow-indicated direction and remove the reel disk (take-up side).
(2) Remove the spring attached to the main brake assembly.
(3) Remove the lug (A) of the main brake assembly (take-up side) and pull out the lug (B) after bringing it into alignment with the main deck notch.
(4) Remove the lugs (C), (D) and (E) of the main brake assembly (supply side) from the main deck and pull them off. (See Fig.2-2-20a.)
(5) When installing the main brake assembly (take-up side), slide the brake lever in the direction as indicated by the arrow to prevent it from hitting the projection of the main brake assembly (take-up side). (See Fig.2-2-20b.)

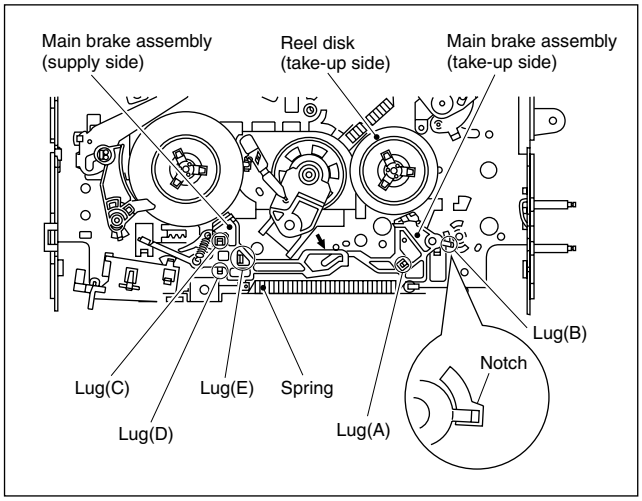
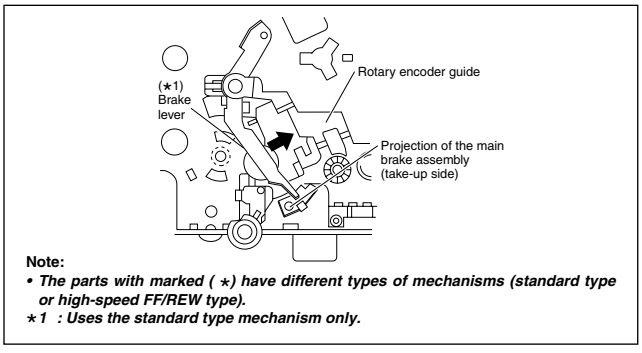


Fig. 2-2-20a



Note:
• The parts with marked (⋆) have different types of mechanisms (standard type or high-speed FF/REW type).
⋆1 : Uses the standard type mechanism only.

Fig. 2-2-20b

2.2.21 Tension brake assembly, reel disk (supply side) and tension arm assembly

1. How to remove

(1) Remove the three lugs of the tension brake assembly from the main deck and pull them off.
(2) Remove the reel disk (supply side) by loosening in the arrow-indicated direction the main brake assembly (supply side).
(3) Remove the tension spring on the back of the main deck. Then release the lug of the tension arm bearing in the arrow-indicated direction and draw out the tension arm assembly. (See Fig. 2-2-21a.)

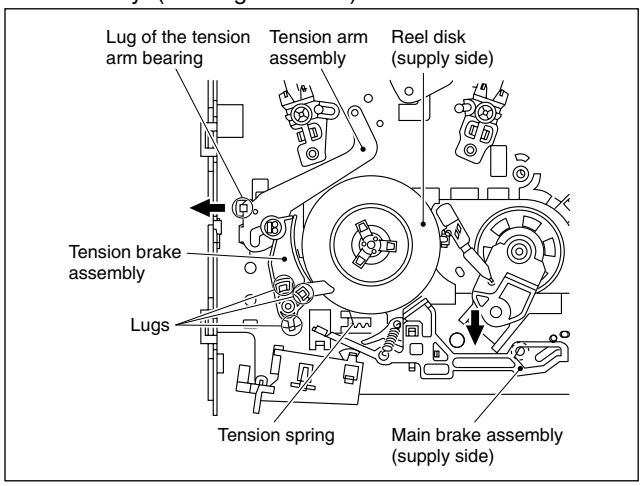


Fig. 2-2-21a

2.2.22 Idler lever, idler arm assembly

1. How to remove

(1) Remove the lug of the idler lever from the main deck and remove the hook fitted in the idler arm assembly hole by lifting it.
(2) Remove the slit washer and pull out the idler arm assembly.

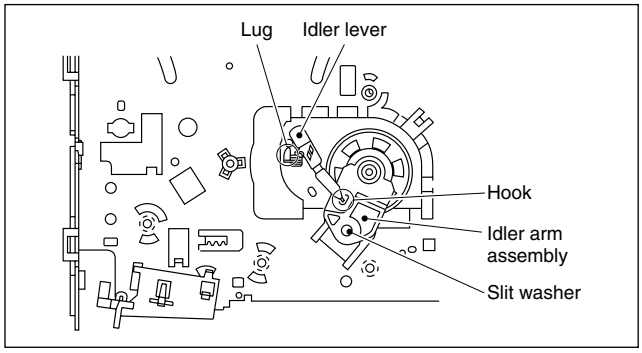


Fig. 2-2-22a

2.2.23 Stator assembly

(1) Remove the flat cable.
(2) Remove the two screws (A), (B) and remove the lug wire.
(3) Remove the stator assembly by lifting in the arrow-indicated direction. (Take care that the brush spring does not jump out.)

Notes:

- ***Be careful not to lose the brush and spring.***
- ***There are some models that do not use the lug wire. Refer to the parts list for these models.***
- ***When tightening the screw (B), place the caulked part of the lug terminal near to the shaft of the drum and then tighten it.***
- ***After installation, be sure to perform the switching point adjustment according to the electrical adjustment procedure.***

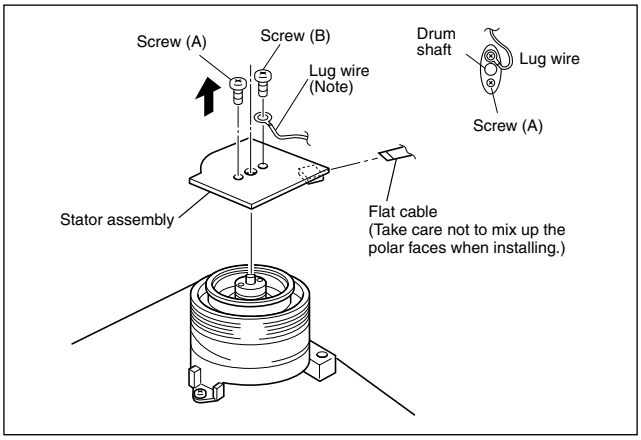


Fig. 2-2-23a

2.2.24 Rotor assembly

1. How to remove

(1) Remove the stator assembly.
(2) Remove the two screws (B) and remove the rotor assembly.

2. How to install

(1) Match the phases of the upper drum assembly and the rotor assembly as indicated in Fig.2-2-24a.
(2) Place the upper drum assembly hole (a) over the rotor assembly holes (b) (with three holes to be aligned) and tighten the two screws (B). (See Fig.2-2-24a.)

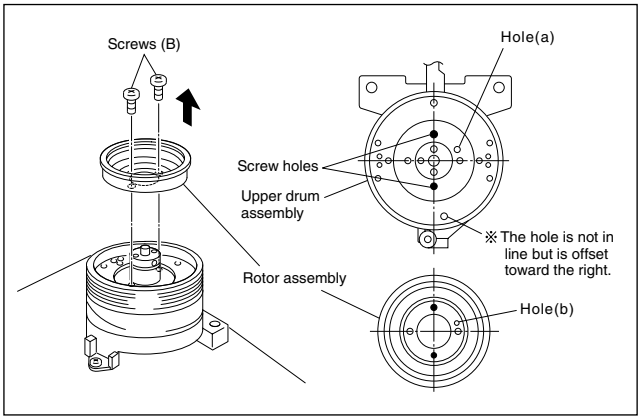


Fig. 2-2-24a

2.2.25 Upper drum assembly

Notes:

- ***To replace the upper drum assembly only may not be possible with some models. For upper drum assembly replacement, refer to the parts list. (When the parts number of the upper drum assembly is not listed on the parts list, then this cannot be replaced.)***
- ***When replacement is required, control the up- down movement of the brush. Never apply grease.***
- ***When replacing the upper drum assembly, replace it the together with the washer.***

1. How to remove

(1) Remove the stator assembly and rotor assembly.
(2) Loosen the screw of the collar assembly using a 1.5 mm hexagonal wrench and remove the collar assembly. Also remove the brush, spring and cap at one time.
(3) Remove the upper drum assembly and remove the washer using tweezers.

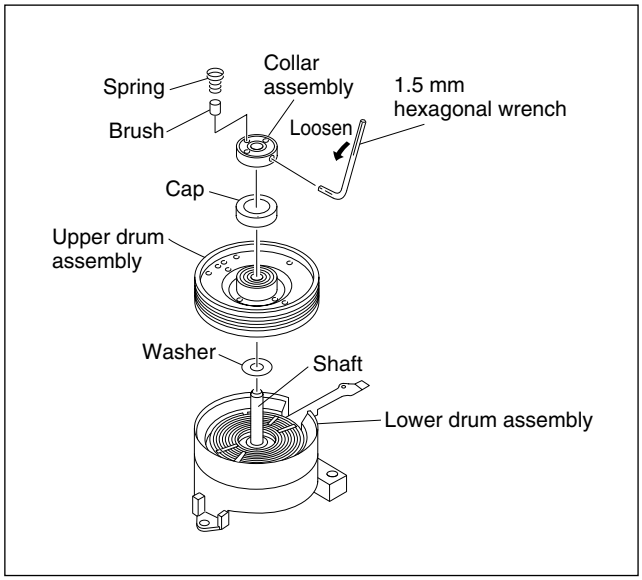


Fig. 2-2-25a

2. How to install

(1) Clean the coil parts of the lower drum assembly and the newly installed upper drum assembly with an air brush in advance. (See Fig.2-2-25b.)
(2) Install a new washer and upper drum assembly on the drum shaft. (See Fig.2-2-25a.)
(3) Install the cap to the upper drum assembly.
(4) Position the collar assembly as indicated in Fig.2-2-25c while controlling its up- down movement.
(5) Secure the collar assembly in position with a hexagonal wrench while pressing its top with the fingers.
(6) After installation, gently turn the upper drum assembly with your hand to make sure that it turns normally. Then install the brush and the spring.
(7) Install the rotor assembly and stator assembly according to Fig 2-2-23a and 2-2-24a.
(8) When installation is complete, clean the upper drum assembly and lower drum assembly and carry out the following adjustments.
   - PB switching point adjustment
   - Slow tracking adjustment
   - Compatibility adjustment (Be sure to check for compatibility for the EP (or LP) mode.)

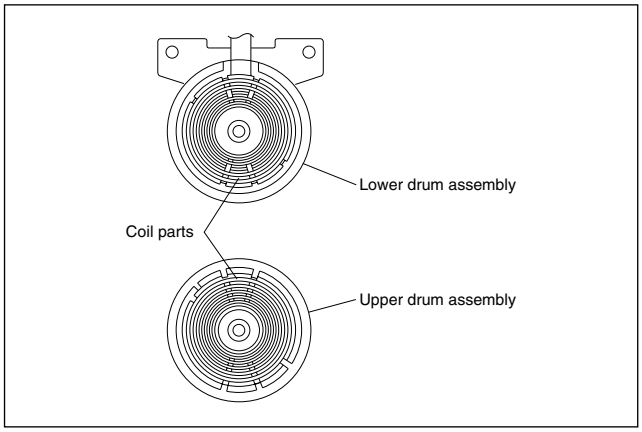


Fig. 2-2-25b

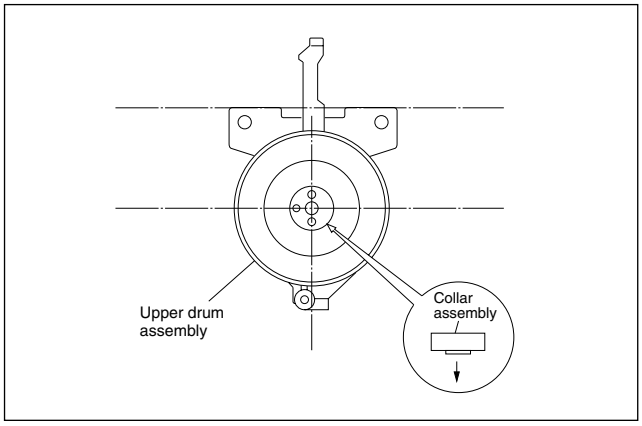


Fig. 2-2-25c

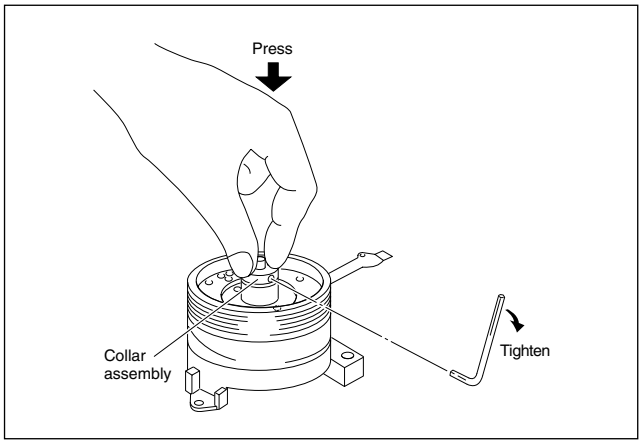


Fig. 2-2-25d

2.3 Compatibility adjustment

Notes:

- ***Although compatibility adjustment is very important, it is not necessary to perform this as part of the normal servicing work. It will be required when you have replaced the A/C head, drum assembly or any part of the tape transport system.***
- ***To avoid any damage to the alignment tape while performing the compatibility adjustment, get a separate cassette tape (for recording and play back) ready to be used for checking the initial tape running behavior.***
- ***Unless otherwise specified, all measuring points and adjustment parts are located on the Main board.***
- ***When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). (See SECTION 1 DISASSEMBLY.)***

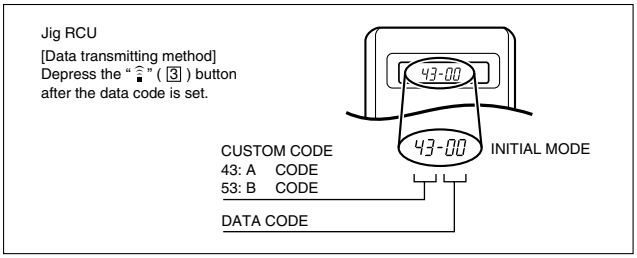


Fig. 2-3a Jig RCU [PTU94023B]

2.3.1 FM waveform linearity

Signal	(A1) (A2)	• Alignment tape(SP, stairstep, NTSC) [MHP] • Alignment tape(EP, stairstep, NTSC) [MHP-L]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• Guide roller [Mechanism assembly]
Specified value	(G)	• Flat V.PB FM waveform
Adjustment tool	(H)	• Roller driver [PTU94002]

(1) Play back the alignment tape (A1).
(2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
(3) Set the VCR to the manual tracking mode.
(4) Make sure that there is no significant level drop of the V.PB FM waveform caused by the tracking operation, with its generally parallel and linear variation ensured. Perform the following adjustments when required. (See Fig. 2-3-1a.)
(5) Reduce the V.PB FM waveform by the tracking operation. If a drop in level is found on the left side, turn the guide roller of the pole base assembly (supply side) with the roller driver to make the V.PB FM waveform linear.
If a drop in level is on the right side, likewise turn the guide roller of the pole base assembly (take-up side) with the roller driver to make it linear. (See Fig. 2-3-1c.)
(6) Make sure that the V.PB FM waveform varies in parallel and linearly with the tracking operation again. When required, perform fine-adjustment of the guide roller of the pole base assembly (supply or take-up side).
(7) Unload the cassette tape once, play back the alignment tape (A1) again and confirm the V.PB FM waveform.
(8) After adjustment, confirm that the tape wrinkling does not occur at the roller upper or lower limits. (See Fig. 2-3-1d.)

[Perform adjustment step (9) only for the models equipped with SP mode and EP (or LP) mode.]

(9) Repeat steps (1) to (8) by using the alignment tape (A2).

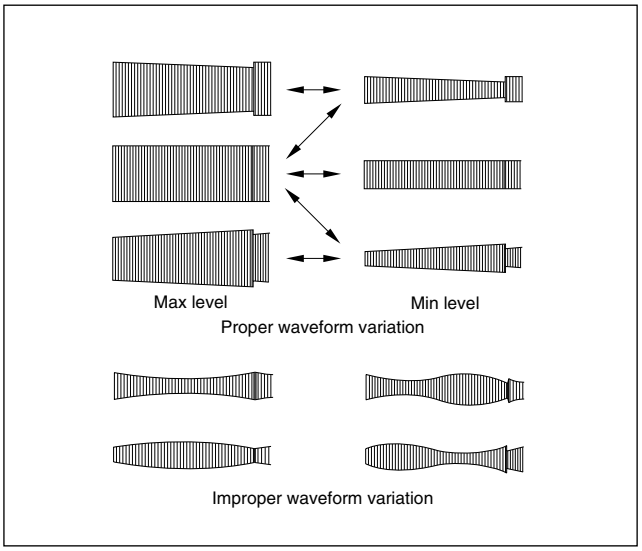


Fig. 2-3-1a

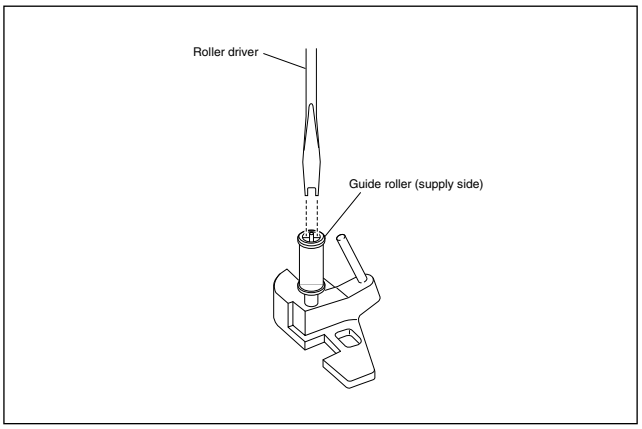


Fig. 2-3-1b

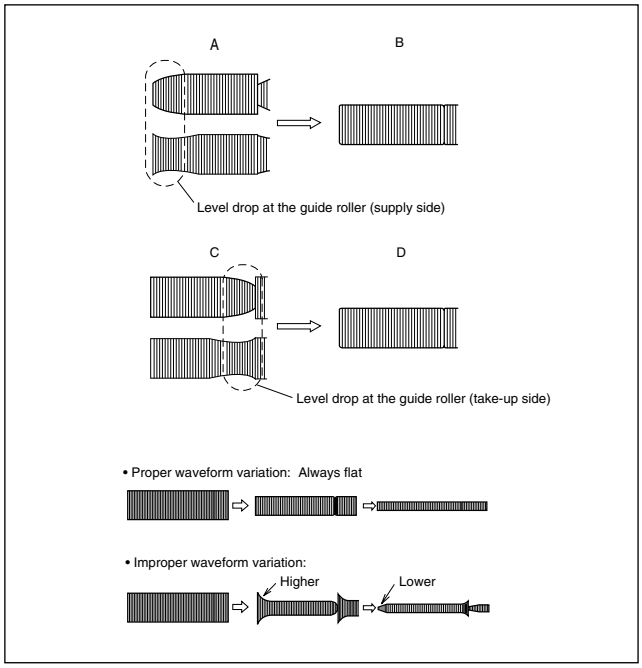


Fig. 2-3-1c

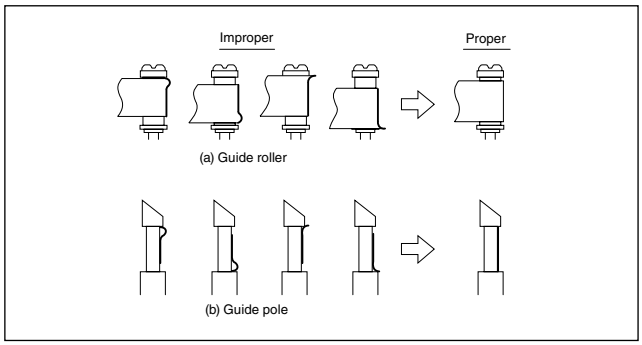


Fig. 2-3-1d

2.3.2 Height and tilt of the A/C head

Note:

- ***Set a temporary level of the height of the A/C head in advance to make the adjustment easier after the A/C head has been replaced. (See Fig.2-2-6c.)***

Signal	(A)	• Alignment tape(SP, stairstep, NTSC) [MHP]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D1) (D2)	• AUDIO OUT terminal • TP4001 (CTL. P)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• A/C head [Mechanism assembly]
Specified value	(G)	• Maximum waveform

(1) Play back the alignment tape (A).
(2) Apply the external trigger signal to D.FF (E), to observe the AUDIO OUT waveform and Control pulse waveform at the measuring points (D1) and (D2) in the ALT mode.
(3) Set the VCR to the manual tracking mode.
(4) Adjust the AUDIO OUT waveform and Control pulse waveform by turning the screws (1), (2) and (3) little by little until both waveforms reach maximum. The screw (1) and (3) are for adjustment of tilt and the screw (2) for azimuth.

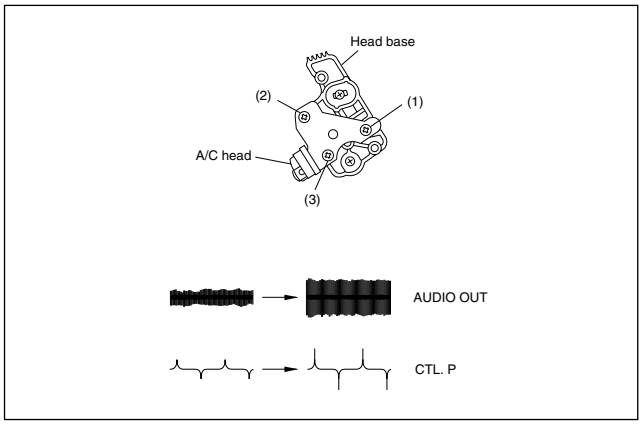


Fig. 2-3-2a

2.3.3 A/C head phase (X-value)

Signal	(A1)	• Alignment tape(SP, stairstep, NTSC) [MHP]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• A/C head base [Mechanism assembly]
Specified value	(G)	• Maximum V.PB FM waveform
Adjustment tool	(H)	• A/C head positioning tool [PTU94010]

(1) Play back the alignment tape (A1).
(2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
(3) Set the VCR to the manual tracking mode.
(4) Loosen the screws (4) and (5), then set the A/C head positioning tool to the innermost projected part of the A/C head. (See Fig. 2-3-3a.)
(5) Turn the A/C head positioning tool fully toward the capstan. Then turn it back gradually toward the drum and stop on the second peak point position of the V.PB FM waveform output level. Then tighten the screws (4) and (5).
(6) Perform the tracking operation and make sure that the V.PB FM waveform is at its maximum.
If it is not at maximum, loosen the screws (4) and (5), and turn the A/C head positioning tool to bring the A/C head to a position, around where the waveform reaches its maximum for the first time. Then tighten the screws (4) and (5).

[Perform adjustment steps (7) to (10) only for 2 Head models equipped with LP mode.]

(7) Then play back the alignment tape (A2).
(8) Set the VCR to the manual tracking mode.
(9) Perform the tracking operation and make sure that the V.PB FM waveform is at its maximum.
(10) If it is not at maximum, loosen the screws (4) and (5), and turn the A/C head positioning tool to bring the A/C head to a position, around where the waveform reaches its maximum for the first time. Then tighten the screws (4) and (5).

Note:

- ***After adjusting, always perform the confirmation and re-adjustment of the item 2.3.4.***

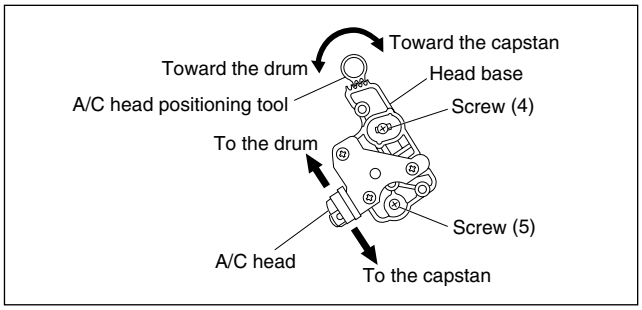


Fig. 2-3-3a

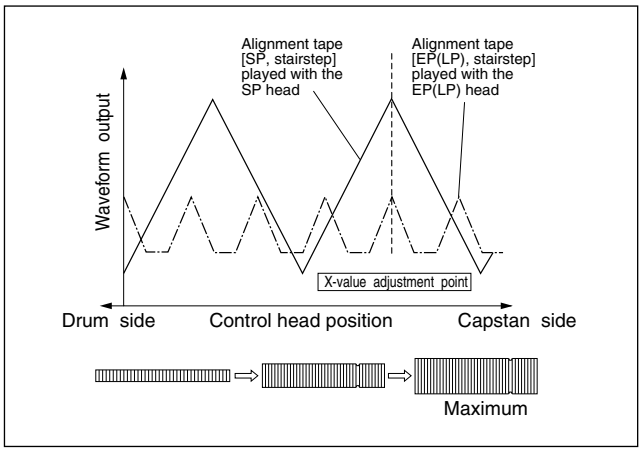


Fig. 2-3-3b

2.3.4 Standard tracking preset

Signal	(A)	• Alignment tape(EP, stairstep, NTSC) [MHP-L]
Mode	(B)	• PB → Auto adjust
Equipment	(C)	• Oscilloscope
Measuring point	(D)	• TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)
Adjustment part	(F)	• Jig RCU: Code “50”
Specified value	(G)	• STOP mode (Maximum V.PB FM waveform)
Adjustment tool	(H)	• Jig RCU [PTU94023B]

(1) Play back the alignment tape (A).
(2) Apply the external trigger signal to D.FF (E), to observe the V.PB FM waveform at the measuring point (D).
(3) Confirm that the automatic tracking operation is completed.
(4) Set the VCR to the Auto adjust mode by transmitting the code (F) twice from the Jig RCU. When the VCR enters the stop mode, the adjustment is completed.
(5) If the VCR enters the eject mode, perform adjustment for the audio control head phase (X-value) again.

2.3.5 Tension pole position

Signal	(A)	• Back tension cassette gauge [PUJ48076-2]
Mode	(B)	• PB
Adjustment part	(F)	• Adjust pin [Mechansim assembly]
Specified value	(G)	• 25 - 51 gf•cm (2.45 – 5 × 10^{-3} Nm]

(1) Play back the back tension cassette gauge (A).
(2) Check that the indicated value on the left side gauge is within the specified value (G).
(3) If the indicated value is not within the specified value (G), perform the adjustment in a following procedure.
  1) Set the VCR to the mechanism service mode. (See SECTION 1 DISASSEMBLY.)
  2) Set the VCR to the play back mode and adjust by turning adjustment pin to align the tension arm assembly edge with the main deck hole (A) on the right edge marker. (See Fig. 2-3-5a)

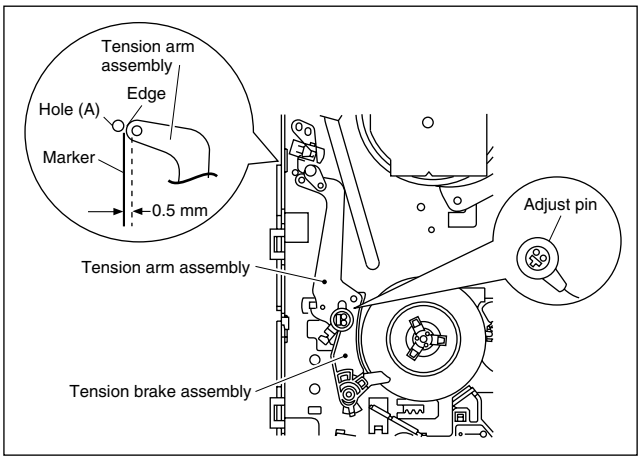
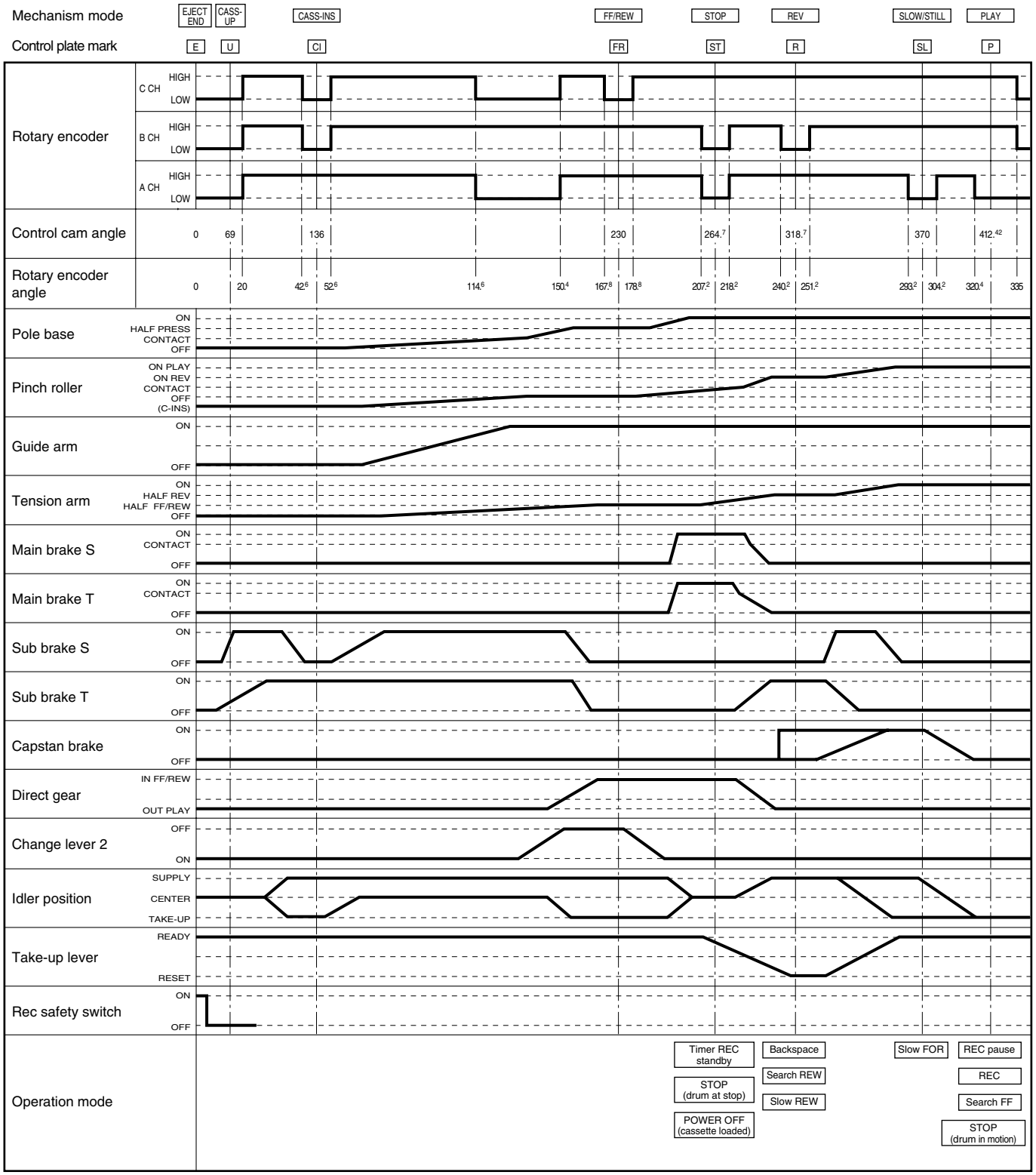


Fig. 2-3-5a

Mechanism Timing Chart



SECTION 3
ELECTRICAL ADJUSTMENT

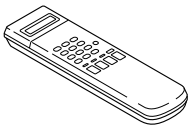
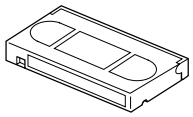
3.1 Precaution

The following adjustment procedures are not only necessary after replacement of consumable mechanical parts or board assemblies, but are also provided as references to be referred to when servicing the electrical circuitry.
In case of trouble with the electrical circuitry, always begin a service by identifying the defective points by using the measuring instruments as described in the following electrical adjustment procedures. After this, proceed to the repair, replacement and/or adjustment. If the required measuring instruments are not available in the field, do not change the adjustment parts (variable resistor, etc.) carelessly.

3.1.1 Required test equipments

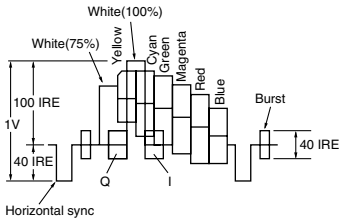
- Color (colour) television or monitor
- Oscilloscope: wide-band, dual-trace, triggered delayed sweep
- Signal generator: RF / IF sweep / marker
- Audio level meter
- Signal generator: stairstep, color (colour) bar [NTSC]
- Recording tape
- Digit-key remote controller(provided)

3.1.2 Required adjustment tools

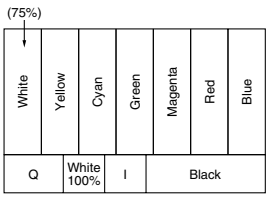
Jig RCU PTU94023B	Alignment tape (SP, stairstep, NTSC) MHP
	

3.1.3 Color (colour) bar signal, color (colour) bar pattern

• Color(colour) bar signal [NTSC]



• Color(colour) bar pattern [NTSC]



3.1.4 Switch settings and standard precautions

The SW settings of the VCR and the standard precautions for the electrical adjustments are as follows.

- ***When using the Jig RCU, it is required to set the VCR to the Jig RCU mode (the mode in which codes from the Jig RCU can be received). (See SECTION 1 DISASSEMBLY.)***

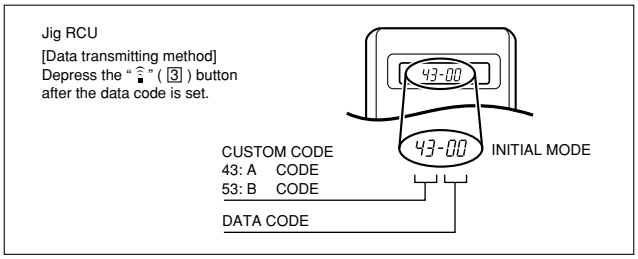


Fig. 3-1-4a Jig RCU [PTU94023B]

- ***Set the switches as shown below unless otherwise specified on the relevant adjustment chart. The switches that are not listed below can be set as desired.***
  If the VCR is not equipped with the functions detailed below, setup is not required.

AUTO PICTURE/VIDEO CALIBRATION/ B.E.S.T./D.S.P.C.	OFF
PICTURE CONTROL/SMART PICTURE	NORMAL/NATURAL
VIDEO STABILIZER	OFF
TBC	ON
Digital 3R	ON
VIDEO NAVIGATION/TAPE MANAGER	OFF

- ***If there is a reference to a signal input methed in the signal column of the adjustment chart, "Ext. S-input" means the Y/C separated video signal and "Ext. input" means the composite video signal input.***
- ***Unless otherwise specified, all measuring points and adjustment parts are located on the Main board.***

3.2 Servo circuit

3.2.1 Switching point

Signal	(A1) (A2)	• Stairstep signal • Alignment tape (SP,stairstep,NTSC) [MHP]
Mode	(B)	• PB
Equipment	(C)	• Oscilloscope
Measuring point	(D1) (D2)	• VIDEO OUT terminal (75Ω terminated) • TP106 (PB. FM)
External trigger	(E)	• TP111 (D.FF)/slope : –
Adjustment part	(F)	• Jig RCU: Code “5A”
Specified value	(G)	• 6.5 ± 0.5H
Adjustment tool	(H)	• Jig RCU [PTU94023B]

(1) Play back the signal (A1) of the alignment tape (A2).
(2) Apply the external trigger signal to D.FF (E) to observe the VIDEO OUT waveform and V.PB FM waveform at the measuring points (D1) and (D2).
(3) Set the VCR to the manual tracking mode.
(4) Adjust tracking so that the V.PB FM waveform becomes maximum.
(5) Set the VCR to the Auto adjust mode by transmitting the code (F) from the Jig RCU. When the VCR enters the stop mode, the adjustment is completed.
(6) If the VCR enters the eject mode, repeat steps (1) to (5) again.
(7) Play back the alignment tape (A2) again, confirm that the switching point is the specified value (G).

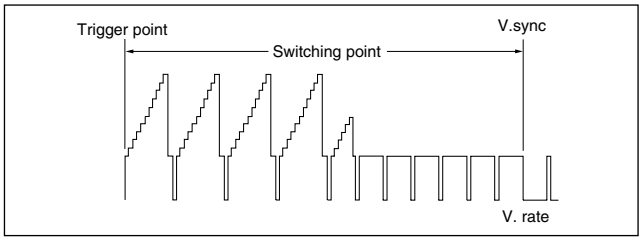


Fig. 3-2-1a Switching point

3.2.2 Slow tracking preset

Signal	(A1) (A2)	• Ext. input • Color (colour) bar signal [NTSC]
Mode	(B1) (B2)	• VHS SP • VHS EP
Measuring point	(D)	• TV-Monitor
Adjustment part	(F)	• Jig RCU: Code “71“ or “72”
Specified value	(G)	• Minimum noise
Adjustment tool	(H)	• Jig RCU [PTU94023B]

(1) Record the signal (A2) in the mode (B1), and play back the recorded signal.
(2) Set the VCR to the manual tracking mode.
(3) Set the VCR to the FWD slow (+1/6x) mode.
(4) Transmit the code (F) from the Jig RCU to adjust so that the noise bar becomes the specified value (G) on the TV monitor in the slow mode.
(5) Set the VCR to the Stop mode.
(6) Confirm that the noise bar is (G) on the TV monitor in the slow mode.
(7) Repeat steps (3) to (6) in the REV slow (–1/6x) mode.
(8) Repeat steps (1) to (7) in the mode (B2).

Note:
- ***For FWD slow (+1/6x) playback, transmit the code “08” from the Jig RCU to enter the slow playback mode, and transmit the code “D0” for REV slow (–1/6x) mode.***

3.3 Video circuit

3.3.1 Auto picture initial setting

Signal	(A1) (A2) (A3)	• Ext. input • Video: Optional • VHS tape
Mode	(B)	• EE → Auto adjust (SP/LP REC → PB)
Adjustment part	(F)	• Jig RCU : Code “58”
Specified value	(G)	• STOP mode
Adjustment tool	(H)	• Jig RCU [PTU94023B]

(1) Insert the cassette tape (A3).
(2) Set the VCR to the Auto adjust mode by transmitting the code (F) from the Jig RCU. When the VCR enters the stop mode, the adjustment is completed. When the VCR enters the eject mode, repeat steps (1) to (2) again.

3.4 Demodulator circuit

Note:
- ***Unless otherwise specified, set an audio multiplex TV signal generator as follows;***
  RF signal : 70 dBμ/75Ω, P/S=6 dB, color bar 87.5% modulation.

3.4.1 Separation

Signal	(A)	• RF signal (Audio: R-ch 300 Hz 30% modulated)
Mode	(B)	• Tuner • EE
Equipment	(C)	• Audio level meter
Measuring point	(D)	• AUDIO OUT Terminal (L)
Adjustment part	(F)	• VR6502 (SEPARATION 2)
Specified value	(G)	• Minimum level

(1) Set an audio signal mode of the RF signal generator to alternate R-ch 300 Hz 30% modulated.
(2) Connect the equipment (C) to the measuring point (D).
(3) Adjust the Adjustment part (F) so that the output level of the measuring point (D) becomes the specified value (G).

SECTION 4
CHARTS AND DIAGRAMS

NOTES OF SCHEMATIC DIAGRAM

Safety precautions
The Components identified by the symbol ⚠ are critical for safety. For continued safety, replace safety critical components only with manufacturer's recommended parts.

1. Units of components on the schematic diagram

Unless otherwise specified.

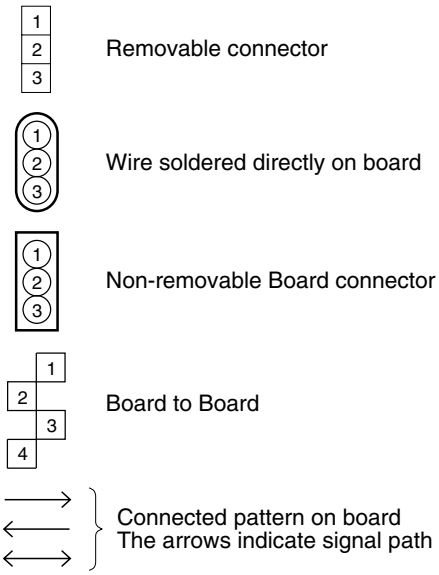
1) All resistance values are in ohm, 1/6 W, 1/8 W (refer to parts list).
   Chip resistors are 1/16 W.
   K or k: kΩ (1000Ω), M: MΩ (1000kΩ)
2) All capacitance values are in μF, (P: PF).
3) All inductance values are in μH, (m: mH).
4) All diodes are 1SS133, MA165 or 1N4148M (refer to parts list).

2. Indications of control voltage

AUX : Active at high

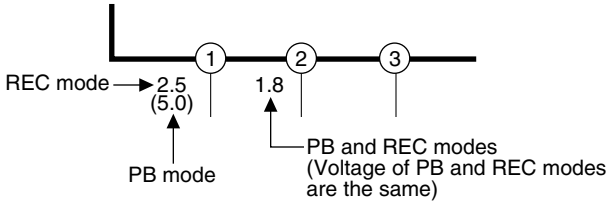
$\overline{\text{AUX}}$ or AUX(L) : Active at low

3. Interpreting Connector indications



4. Voltage measurement

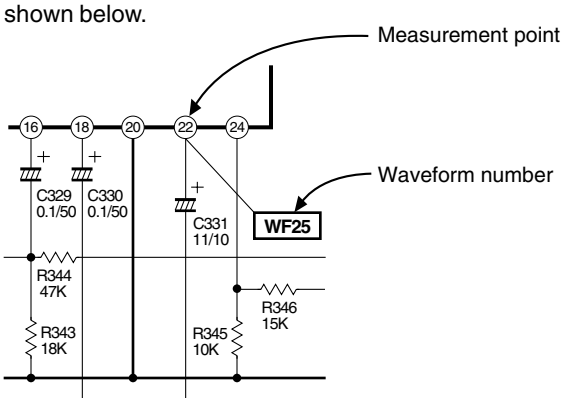
1) Video circuits
   REC : Colour bar signal in SP mode, normal VHS mode
   PB : Alignment tape, colour bar SP mode, normal VHS mode
   — : Unmeasurable or unnecessary to measure
2) Audio circuits
   REC : 1KHz, –8 dBs sine wave signal in SP mode, Normal VHS mode
   PB : REC then playback it
3) Movie Camera circuits
   Measured using a correctly illuminated gray scale or colour bar test charts in the E-E mode
4) Indication on schematic diagram
   Voltage Indications for REC and PB mode on the schematic diagram are as shown below.



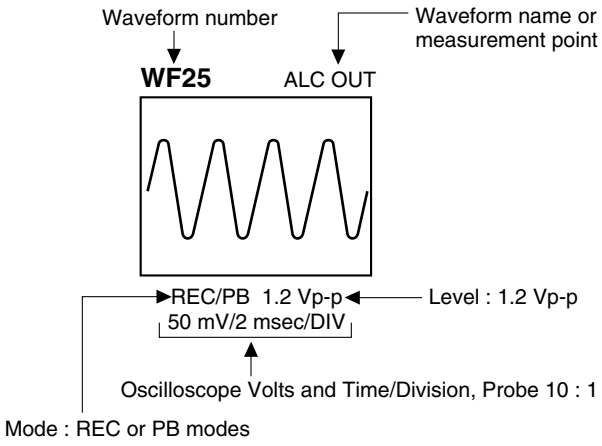
Note: If the voltages are not indicated on the schematic diagram, refer to the voltage charts.

5. Waveform measurement

1) Video circuits
   REC : Colour bar signal in SP mode, normal VHS mode
   PB : Alignment tape, colour bar SP mode, normal VHS mode
2) Audio circuits
   REC : 1KHz, –8 dBs sine wave signal in SP mode, normal VHS mode
   PB : REC then playback it
3) Movie Camera circuits
   Measured using a correctly illuminated gray scale or colour bar test chatrs in the E-E mode
4) Indication on schematic diagram
   Waveform indications on the schematic diagram are as shown below.



5) Waveform indications



6. Signal path Symbols

The arrows indicate the signal path as follows.

Playback signal path

Playback and recording signal path

Recording signal path
(including E-E signal path)

Capstan servo path

Drum servo path

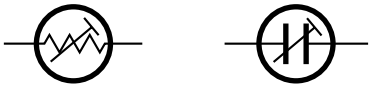
(Example)

R-Y Playback R-Y signal path

Y Recording Y signal path

7. Indication of the parts for adjustments

The parts for the adjustments are surrounded with the circle as shown below.



8. Indication of the parts not mounted on the circuit board

"OPEN" is indicated by the parts not mounted on the circuit board.

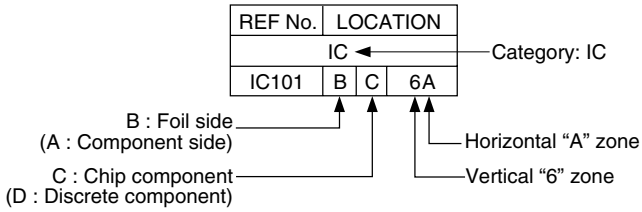
CIRCUIT BOARD NOTES

1. Foil and Component sides

1) Foil side (B side) :
   Parts on the foil side seen from foil face (pattern face) are indicated.
2) Component side (A side) :
   Parts on the component side seen from component face (parts face) indicated.

2. Parts location guides

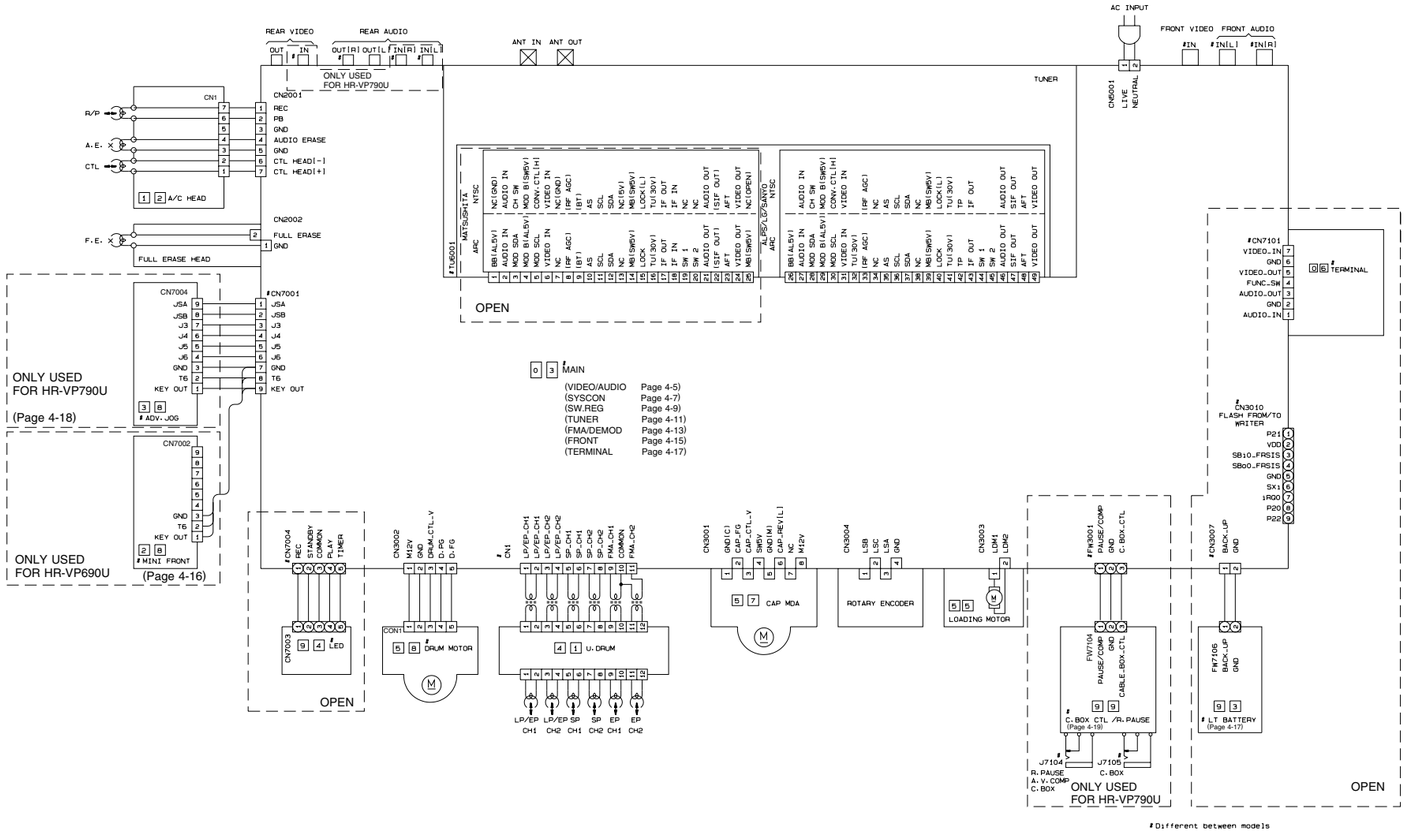
Parts location are indicated by guide scale on the circuit board.



Note:

For general information in service manual, please refer to the Service Manual of GENERAL INFORMATION Edition 4 No. 82054D (January 1994).

4.1 BOARD INTERCONNECTIONS



NO	NAME
99	C. BOX CTL/R. PAUSE
94	LED
93	LT BATTERY
58	DRUM MOTOR
57	CAP MDA
55	LOADING MOTOR
41	U. DRUM
38	ADV. JOG
28	MINI FRONT
12	A/C HEAD
06	TERMINAL
03	MAIN

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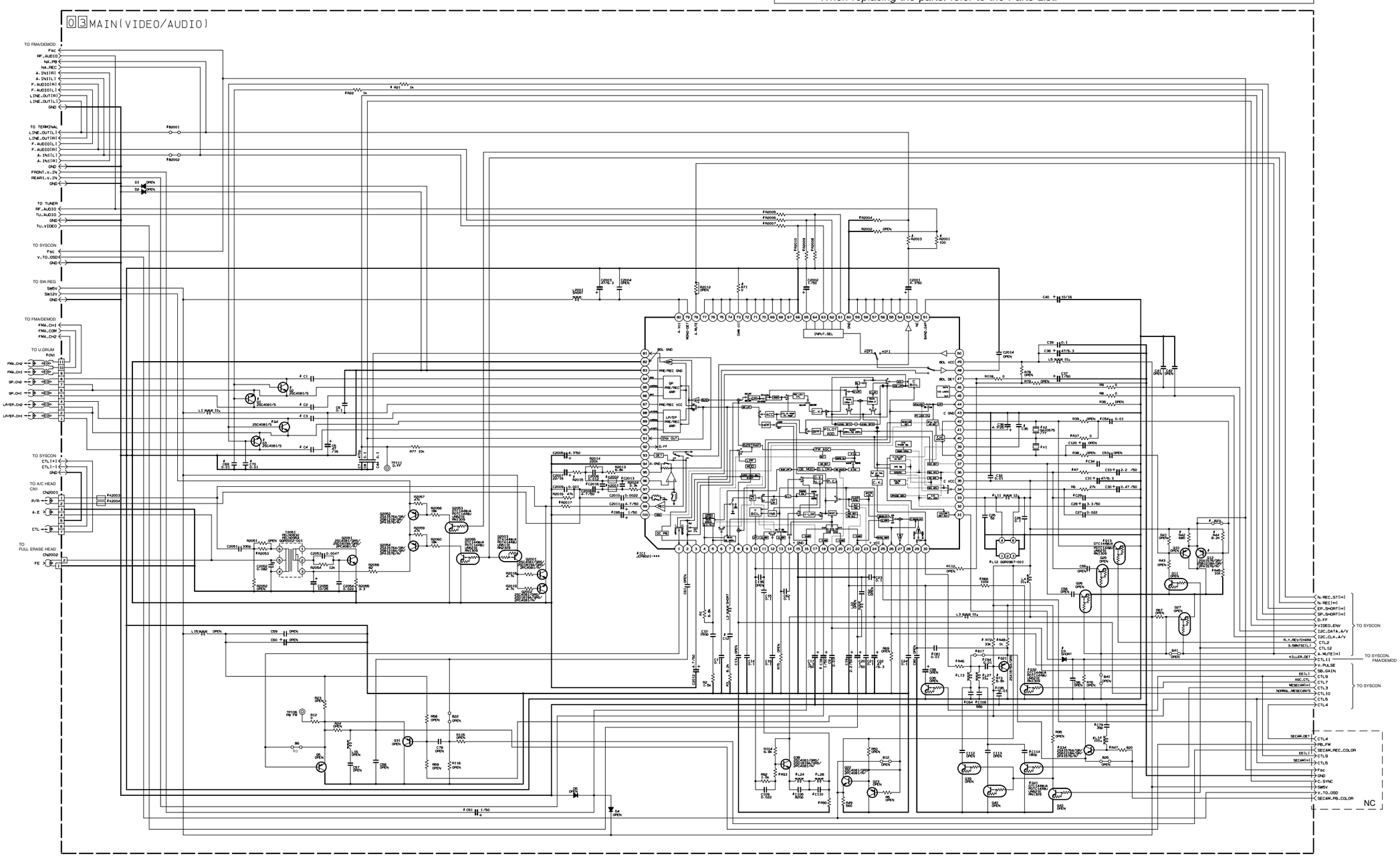
4.2 MAIN (VIDEO/AUDIO) SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



○ : Used × : Not used

#DIFFERENCE TABLE 1

		IC1	X1	D3	Q1-Q4	Q12	Q13	Q32	Q41	R7	R21-R22	R37-R42-R44-R45	R46	R66	R90	R93	C12	C29	C34	C35	C54	C64	C65	C69-C70	C81	C106	C108	C110	C114	L13	L24	L27	L28	B17	B23	Q21-Q34-R47-R48-R72-R73-C79-C94-C95-L14
NTSC	PCE(/50)	NVD-2	X	X	X	X	X	O	X	B20	X	X	I20	O	470	1K	33p	4700p	0.1	0.033	X	20p	X	X	O	X	X	330p	X	68μ	SHORT	X	15μ	X	O	X
	OTHERS	NVD-2	X	X	X	X	X	O	X	B20	X	X	I20	O	470	1K	33p	4700p	0.1	0.033	X	X	X	X	O	X	X	330p	X	X	SHORT	X	15μ	X	O	X
PAL M		MVD-2	QAX0578	O	X	O	O	O	X	B20	X	O	I20	O	470	1K	33p	0.068	0.1	0.01	O	X	X	X	O	X	X	330p	X	X	SHORT	X	15μ	X	X	X
PAL N	Hi-Fi	MVD-2	QAX0580	X	X	O	X	O	X	B80	X	O	I20	O	390	2.2K	47p	0.033	0.22	0.033	O	X	X	X	O	X	O	82p	X	X	27μ	X	68μ	X	X	X
	MONO	MVD-2	QAX0580	X	X	O	X	O	X	B80	X	O	I20	O	390	2.2K	47p	0.033	0.22	0.01	O	X	X	X	O	X	O	82p	X	X	27μ	X	68μ	X	X	X
PAL/ARC	Hi-Fi	MVD-2	QAX0576/79	X	X	O	X	X	O	B80	X	O	I30	X	390	2.2K	47p	0.033	0.22	0.01	O	22p	O	X	O	O	O	82p	O	33μ	27μ	O	68μ	O	X	X
	MONO	MVD-2	QAX0576/79	X	X	O	X	X	O	B80	X	O	I30	X	390	2.2K	47p	0.033	0.22	0.01	O	22p	O	X	O	O	O	82p	O	33μ	27μ	O	68μ	O	X	X
With SECAM	Hi-Fi	MVD-2	QAX0576/79	X	X	O	X	X	O	B80	X	O	I30	X	390	2.2K	47p	0.033	0.22	0.01	O	22p	O	X	O	O	O	82p	O	33μ	27μ	O	68μ	O	X	O
	MONO	MVD-2	QAX0576/79	X	X	O	X	X	O	B80	X	O	I30	X	390	2.2K	47p	0.033	0.22	0.01	O	22p	O	X	O	O	O	82p	O	33μ	27μ	O	68μ	O	X	O

NOTES:UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

#DIFFERENCE TABLE 2

3.58NTSC	X2
YES	O
NO	X

#DIFFERENCE TABLE 3

INPUT	C18	C51
FRONT	X	O
REAR	O	X
FRONT/REAR	O	O

#DIFFERENCE TABLE 4

HEAD TYPE		C1-C2	C3-C4	R71	CN1
4HEAD Hi-Fi	NTSC/PAL-M	1	1	X	11 PIN(1-11)
	PAL/ARC/PAL-N	0.01	0.01	X	11 PIN(1-11)
4HEAD MONO	NTSC/PAL-M	1	1	X	8 PIN(1-8)
	PAL/ARC/PAL-N	0.1	0.1	X	8 PIN(1-8)
2HEAD		0.1	X	O	4 PIN(5-8)

#DIFFERENCE TABLE 8

CE	L11	L12
YES	X	O
NO	O	X

#DIFFERENCE TABLE 6

	DESTINATION	INPUT	FRONT IN R2006	FRONT IN R2009	FMA ○ AV(Hi-Fi) REAR IN/OUT IN(MONO) R2002	R2007	R2010
Hi-Fi	NTSC/PAL M/PAL N		X	X	X	12k	12k
	ARC		X	X	18k	12k	
MONO	NTSC/PAL M/PAL N	FRONT/REAR	47k	6.8k	O	47k	6.8k
		FRONT	47k	6.8k	X	X	X
	PAL/ARC	REAR	X	X	O	47k	6.8k
		FRONT/REAR	47k	5.6k	O	47k	5.6k
		FRONT	47k	5.6k	X	X	X
		REAR	X	X	O	47k	5.6k

#DIFFERENCE TABLE 7

		C2013	C2016	K2001-K2002	K2003-K2004
Hi-Fi	NTSC/ARC	X	X	SHORT	SHORT
	PAL M/PAL N				
MONO	NTSC/ARC	X	X	SHORT	SHORT
	PAL M/PAL N				
	PAL				

#DIFFERENCE TABLE 5

		RF-OUT R2001	AV(→TMA(Hi-Fi) LINE OUT(MONO) R2001	R2003	R2004	TU-IN R2005	R2008	FM GAIN R2015	REC LEVEL R2017	BIAS LEVEL R2053
Hi-Fi	NTSC/PAL M	X	X	100	X	X	X	180	12k	2.7k
	PAL N	X	X	100	X	X	X	120	18k	5.6k
	PAL/ARC	X	X	100	X	X	X	180	15k	3.9k
MONO	NTSC/PAL M	O	O	680	2.7k	33k	47k	180	12k	2.7k
	PAL N	O	O	680	2.7k	33k	47k	120	18k	5.6k
	PAL/ARC	O	O	100	4.7k	15k	10k	180	15k	3.9k

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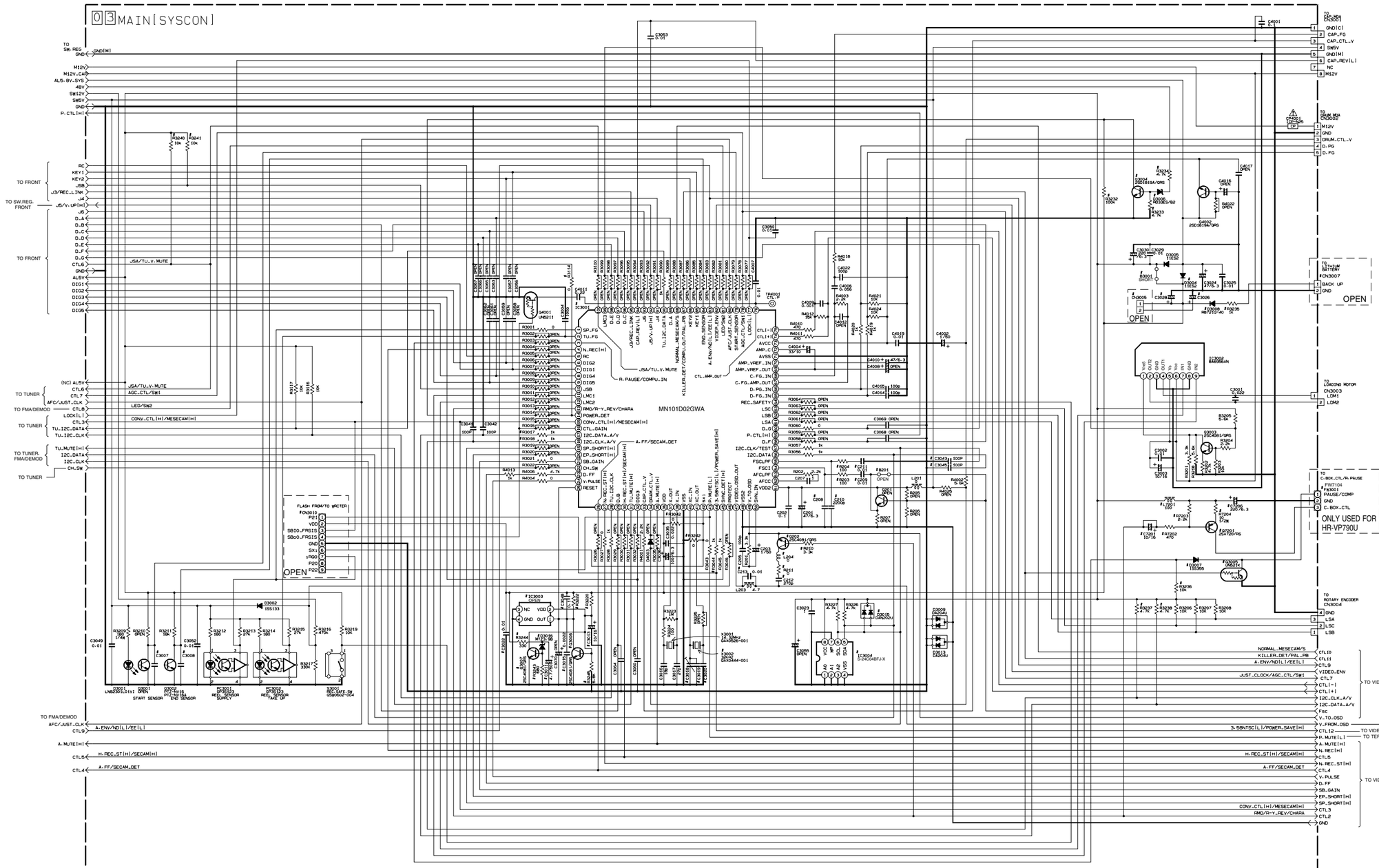
4.3 MAIN (SYSCON) SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



NOTES:UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

- ELECTROLYTIC
- CERAMIC
- MYLER
- NON POLAR

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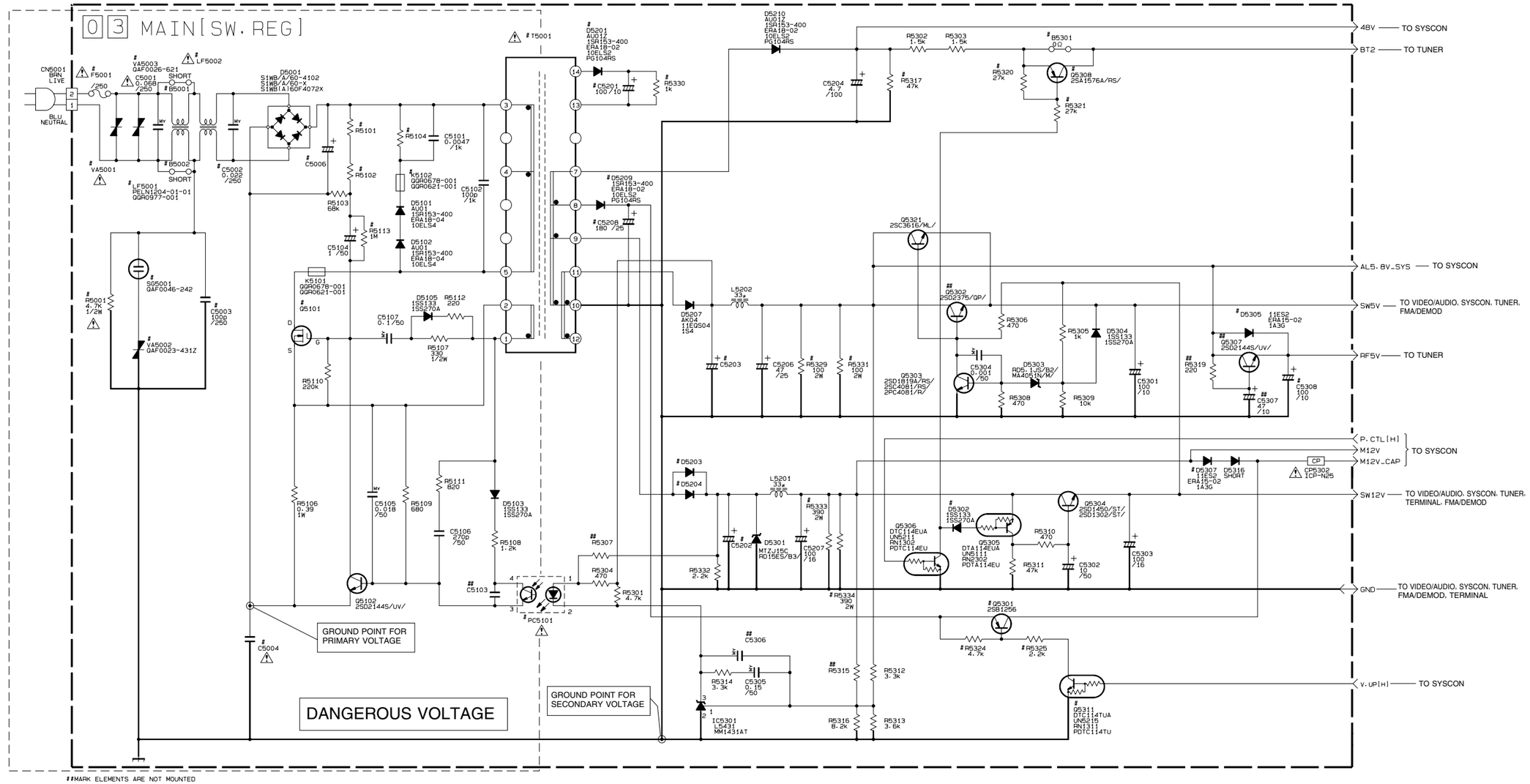
4.4 MAIN (SW.REG) SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



##MARK ELEMENTS ARE NOT MOUNTED

#DIFFERENCE TABLE 1

	Q5101	R5001	C5004	C5006	PC5101	F5001
US	2SK2043 2SK2325	YES	0.0047 /250	47 /200	PS2501-1 PC817 ON3131/RS/ PC817X	1.25A
PH /78	2SK3255	NO	0.0022 /250	68 /400	PS2561L1-1/WL/ PC123F2 ON3171/R/	2A
OTHER	2SK2632 2SK2129	NO	0.0022 /250	68 /400	PS2561L1-1/WL/ PC123F2 ON3171/R/	2A

#DIFFERENCE TABLE 2

CE	Q5308 R5317 R5320 R5321	B5301	D5302	R5101 R5102	R5104	C5002	LF5001	LF5002	B5002 B5001
-YES-	YES	NO	YES	330k	150k 2W	YES	YES	QQR0608-001 QQR0609-001 QQR0610-001 QQR0978-001	NO
-NO-	NO	YES	SHORT	220k	68k 2W	NO	NO	QQR0533-001 QQR0532-001 QQR0516-001 QQR0932-001 QQR0816-001	YES

#DIFFERENCE TABLE 8

	C5202	C5203
US	1000 /16	1000 /10
OTHER	680 /16	680 /10

#DIFFERENCE TABLE 3

SURGE	SG5001	VA5001	VA5002	R5113	VA5003
US	SHORT	QAF0023-431Z QAF0024-431Z QAF0039-431Z	NO	NO	NO
OTHER	NO	NO	NO	NO	NO
US[PHILIPS]	YES	QAF0023-431Z	YES	YES	NO
PH AUTO VOLTAGE	NO	NO	NO	NO	YES

#DIFFERENCE TABLE 4

RF5V	D5305
-YES-	YES
-NO-	NO

#DIFFERENCE TABLE 5

ROOM ANT	C5003	K5102
PHILIPS/78	YES	YES
PHILIPS/75	YES	SHORT
OTHER	NO	SHORT

#DIFFERENCE TABLE 6

		R5329	R5331	R5333	R5334
AUTO VOLTAGE	RF5V -YES-	NO	NO	YES	YES
	RF5V -NO-	NO	YES	YES	YES
OTHER		NO	NO	NO	NO

#DIFFERENCE TABLE 7

HIGH SPEED FF/REW	T5001	Q5301 Q5311 R5324 R5326	C5208 D5209	D5201 R5330 C5201	D5307	D5203 D5204
-YES-	QQS0030-002 QQS0031-002 QQS0036-001	YES	YES	YES	YES	AU01Z 10ELS2
-NO-	QQS0083-001 QQS0084-001 QQS0093-001	NO	NO	NO	SHORT	AU01Z 1SR153-400 ERA18-02 10ELS2 PG104RS

NOTES:UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN µF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

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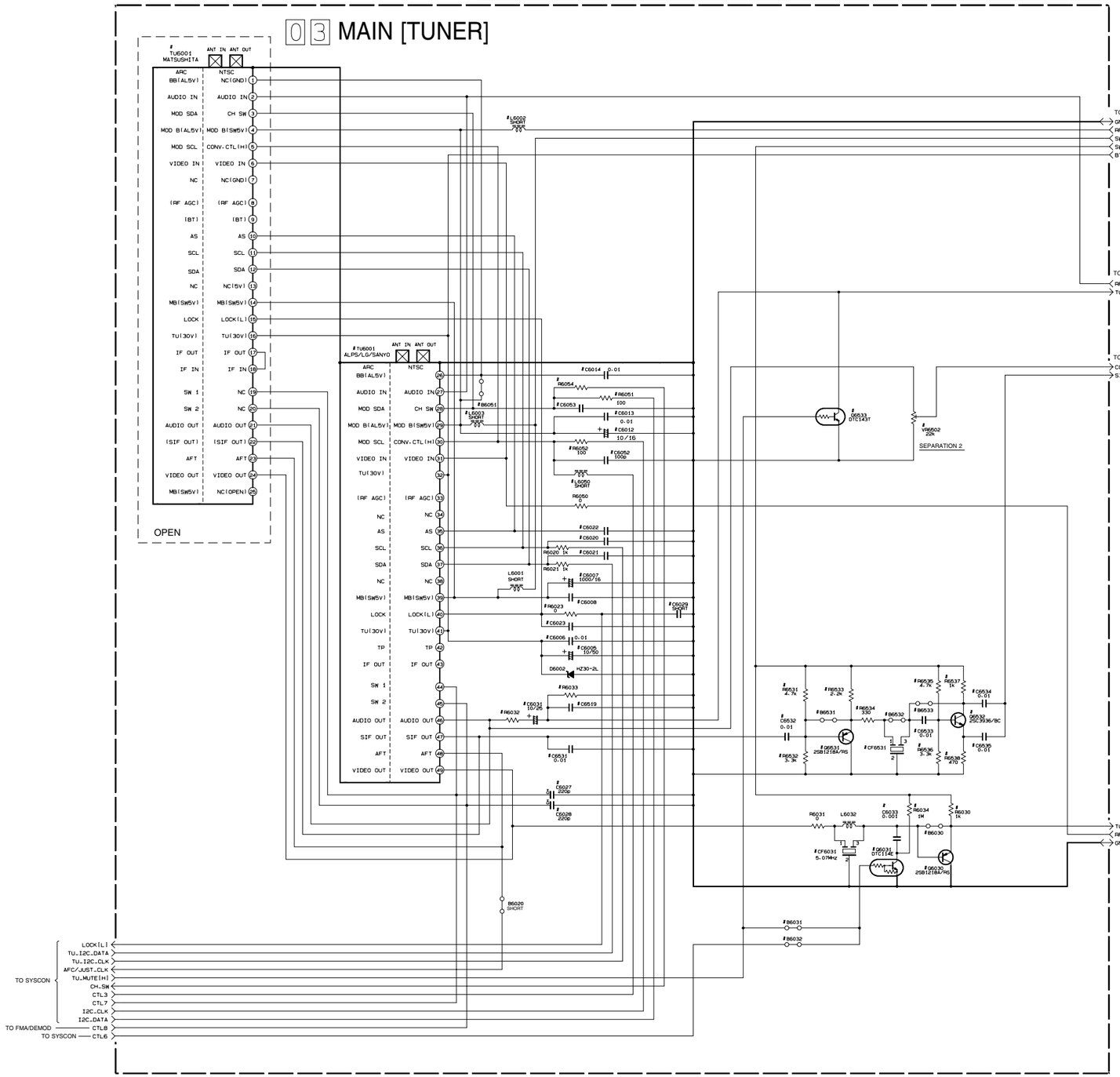
4.5 MAIN (TUNER) SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



CTL3	CONV.CTL(H)/MESECAM(H)
CTL6	J11(USA)/TU_V_MUTE(H)
CTL7	AGC.CTL/SW1
CTL8	LED/SW2

NOTES:UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

○ : Used
× : Not used

DIFFERENCE TABLE (US.PAL-M/N)

		HiFi	MONO
TU6001	ALPS	GAU0207	GAU0207
	SANYO	GAU0226	GAU0226
VIDEO BUFFER	Q6030-R6030-	○	○
	B6030	×	×
VIDEO MUTE	Q6031-R6034-C6033-B6031	×	×
LOCK	R6023-C6023	×	×
	C6029	○	○
MONO	R6032	×	15k
	R6033	×	10k
	C6519	×	0.012
	C6031	×	○
HiFi	VR6502	○	×
MOD B(SW5V)	L6003	○	○
CONV CTL	L6050	○	○
CONV SW	R6054	○	○
	C6005-C6008-C6012-C6014-C6020-C6022-C6052-C6053-Q6501-Q6502-Q6531-Q6533-CF6031-CF6531-B6531-B6533-R6531-R6538-C6531-C6535	×	×
PAL	B6032-B6051-L6002-R6051-R6052-C6027-C6028	×	×

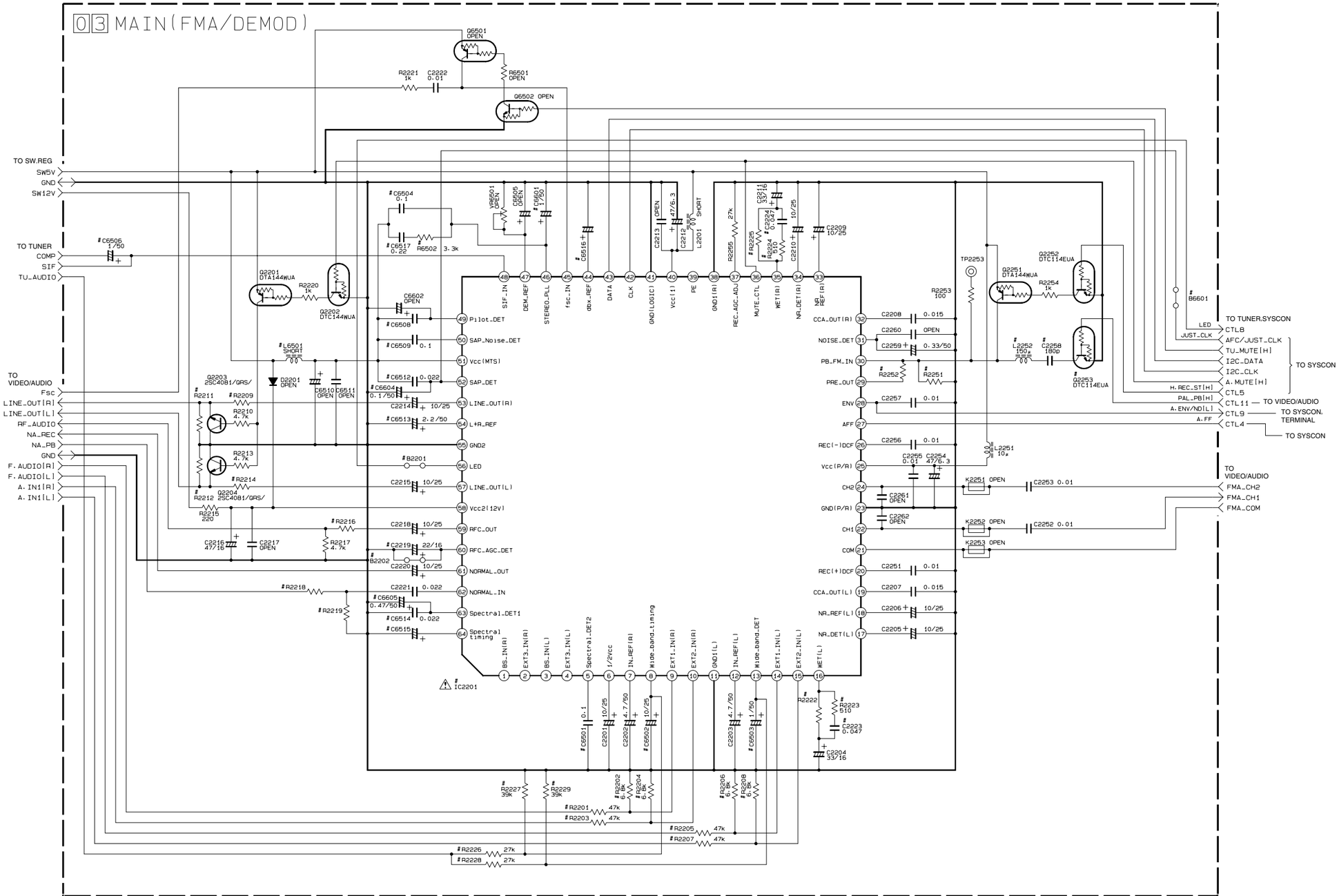
DIFFERENCE TABLE (EUPORE.ASIA - PAL/MS)

		EU/EK		FRANCE MS		ASIA 3SYSTEM		ASIA 4SYSTEM
TUNER UNIT	TU6001	MATSUSHITA	ALPS	ALPS	LG	MATSUSHITA	ALPS	MATSUSHITA
		GAU0208	GAU0209	GAU0210	GAU0211	GAU0208	GAU0209	GAU0212
VIDEO BUFFER	Q6030-R6030	○	○	○	○	○	○	○
	B6030	×	×	×	×	×	×	×
VIDEO MUTE	Q6031-R6034	○	○	○	○	×	×	×
	C6033	0a	0a	0a	0a	×	×	×
	B6031	×	×	×	×	×	×	×
	B6032	○	○	○	○	×	×	×
AUDIO MUTE	Q6533	○	○	○	○	×	×	×
TU I2C	C6020	×	×	×	×	×	×	×
	C6021	×	×	×	×	×	×	×
	C6022	×	×	×	×	×	×	×
LOCK	R6023-C6023	×	×	×	×	×	×	×
	C6029	○	○	○	○	○	○	○
MONO	R6032	3.3k	3.3k	3.9k	3.9k	3.3k	3.3k	0a
	R6033	1.8k	1.8k	1.8k	1.8k	1.8k	1.8k	1.8k
	C6031	○	○	○	○	○	○	○
	C6519	0.047	0.047	0.047	0.047	0.047	0.047	0.047
US MPX	VR6502	×	×	×	×	×	×	×
AL5V	L6002-B6051	○	○	○	○	○	○	○
	C6012	×	×	×	×	×	×	×
	C6013	×	×	×	×	×	×	×
	C6014	○	○	○	○	○	○	○
MOD SDA/SCL	R6051-R6052	○	○	×	×	○	○	○
	R6054-L6050	×	×	×	×	×	×	×
	C6052-C6053	×	×	×	×	×	×	×
SW5V	L6003	×	×	×	×	×	×	×
	C6007	×	×	×	×	×	×	×
	C6008	×	×	×	×	×	×	×
TU(30V)	C6005	×	×	×	×	×	×	×
	C6006	×	×	×	×	×	×	×
SIF OUT	C6531-C6535-R6531-R6536-Q6531-Q6532-B6531-B6533-CF6531	×	×	×	×	×	×	×
CENELEC S2	C6027	×	×	○	×	×	×	×
	C6028	×	×	×	×	×	×	×

p10337001a_rev0

4.6 MAIN (FMA/DEMOD) SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



#DIFFERENCE TABLE (FMA)

INPUT	FRONT	REAR
SYMBOL	R2201 R2202 R2205 R2206	R2203 R2204 R2207 R2208
YES	○	○
NO	×	×

#DIFFERENCE TABLE (FMA/DEMOD)

○ : Used
× : Not used

SYMBOL	B6502 C6502-C6504 C6509 C6512-C6514 C6517	B6601 C6601 C6604 C6605	C6508	C6515	C6516	C6501	C6506 L6501	IC2201	R2226-R2229 R2223 R2224 C2223 C2224 B2202	R2222 R2225	B2201 C2219	R2216	R2218	R2219	R2209 R2214	R2211 R2212	R2251	R2252	Q2253 L2252 C2258
US/PAL-M/PAL-N	○	×	0.022	3.3/50	4.7/50	○	○	AN3663FBP	×	SHORT	○	1k	3.9k	1k	100	3.3k	2.2k	1.5k	×
JPN	×	○	1	1/50	10/25	○	○	AN3672FBP	×	SHORT	○	1k	3.9k	1k	100	3.3k	2.2k	1.5k	×
ARC	×	×	×	×	10/25	SHORT	×	AN3651FBP	○	4.7k	×	1.2k	3.3k	1.2k	680	2.7k	4.7k	220	○

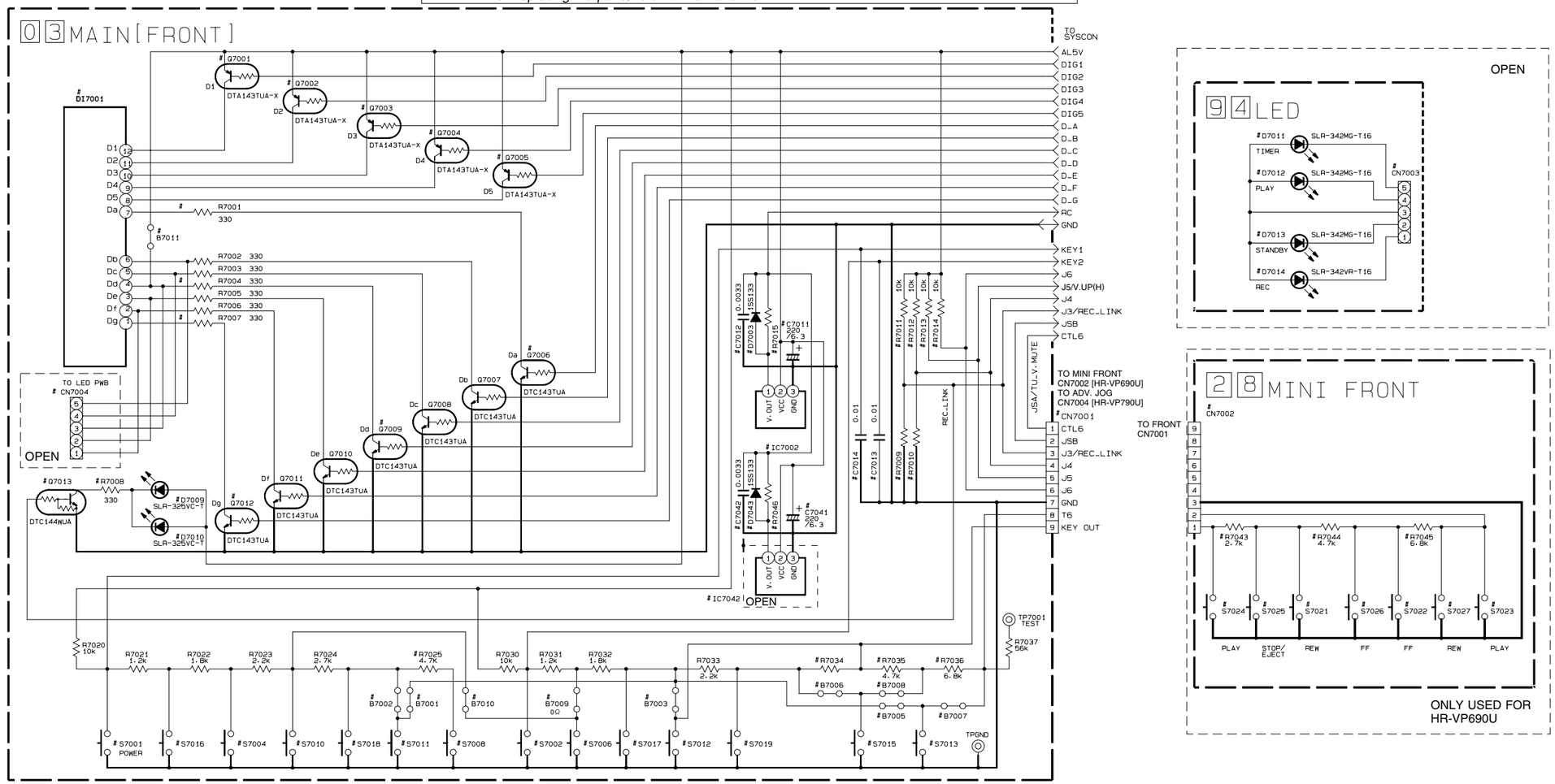
NOTES:UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

p20199001a_rev0

4.7 MAIN (FRONT) AND MINI FRONT SCHEMATIC DIAGRAMS

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



##DIFFERENCE TABLE 1

○ : Used
× : Not used

BRAND	TOOL	WORKING NUMBER	S7001	S7002	S7004	S7006	S700B	S7010	S7011	S7012	S7013	S7014	S7015	S7016	S7017	S7018	S7019	S7021 S7023 S7025	S7024 S7027	SW on UNIT	J/S	DISP	R7025	R7034	R7035 R7036	R7043 R7045	B7001	B7002	B7003	B7004	B7005 B7006	B7007	B7008	B7009	B7010
JVC	400EA	D15 U/UC, D15P U/UC, D1EN	POWER	REC LINK	CH −	CH +	PLAY	E.PROG.	REC	——	PAUSE	——	STOP/ EJECT	DISPLAY	——	——	——	——	——	Adv	Adv	7seg	○	2.7kΩ	○	×	×	○	×	×	○	×	×	○	×
	400E		POWER	C-RESET	CH −	CH +	REVIEW	SP/EP	REC	——	PAUSE	——	STOP/ EJECT	DISPLAY	——	——	——	——	——	——	×	7seg	○	0Ω	×	○	×	○	×	×	○	×	×	○	×
	360H	C0 U/UC, C0P UM, C1 U/UM/M/EN D0 U/UC, D1 M/UM, D1M U/UC A1 A/EM/EA/EE/(A/EA) A11 A, A2 EM C1 A/S/EA/EE/(A/S)	——	——	REW/ CH −	FF/ CH +	——	PLAY	——	——	——	——	——	POWER	STOP/ EJECT	REC	PAUSE /CH	——	——	——	×	7seg	×	2.7kΩ	○	×	×	×	×	×	×	×	○	×
		A0 EU	——	——	REW/ CH −	FF/ CH +	——	PLAY	——	——	——	——	——	STAND-BY	STOP/ EJECT	REC	PAUSE /CH	——	——	——	×	7seg	×	2.7kΩ	○	×	×	×	×	×	×	×	×	○	×
PHILIPS	01A	D1 /78/50, C1 /50	——	——	FF/ CH +	CH	STOP/ EJECT	——	——	——	——	——	——	POWER	REC	REW/ CH −	PLAY	——	——	——	×	7seg	○	2.7kΩ	○	×	×	×	×	×	×	×	×	○	×
		A1(VR120/55), D1(VR602/55)	——	——	FF/ CH +	CH	STOP/ EJECT	——	——	——	——	——	——	POWER	REC	REW/ CH −	PLAY	——	——	——	×	4dig	○	2.7kΩ	○	×	×	×	×	×	×	×	×	×	○
	01B	A1 /55, C1 /50/55/61, D1 /55	POWER	PAUSE	MENU	OK	REC	CH −	CH +	——	——	——	——	VCR/TV	——	——	——	——	○	——	×	7seg	○	0Ω	×	○	○	×	×	×	×	×	×	○	×
	00A		POWER	PAUSE	MENU	OK	REC	CH −	CH +	——	——	——	——	VCR/TV	——	——	——	——	○	——	×		○	0Ω	×	○	○	×	×	×	×	×	×	○	×
SEARS	360H		——	——	REW/ CH −	FF/ CH +	——	PLAY	——	——	——	——	——	POWER	STOP/ EJECT	REC	PAUSE /CH	——	○	——	×	7seg	×	2.7kΩ	○	×	×	×	×	×	×	×	×	○	×
AUDINAC	360H		——	——	REW/ CH −	FF/ CH +	——	PLAY	——	——	——	——	——	POWER	STOP/ EJECT	REC	PAUSE /CH	——	○	——	×	7seg	×	2.7kΩ	○	×	×	×	×	×	×	×	×	○	×

##DIFFERENCE TABLE 2

BRAND	TOOL	IC7002	D7003 C7011-C7012	R7015	D7043 C7041-C7042	IC7042	R7046
JVC	400H, 400EA, 400E	GP1U2910 PNA4652M00YC PIC-28143LJ	×	0Ω	×	×	×
	360H	×	×	×	×	GP1U2910 PNA4652M00YC PIC-28143LJ	0Ω
PHILIPS	01A	×	×	×	○	GP1U2900 PNA4655M00YC PIC-28142LJ	100k
	01B, 00A	GP1U2900 PNA4655M00YC PIC-28142LJ	○	100k	×	×	×

##DIFFERENCE TABLE 3

DISPLAY TYPE	D17001	Q7001-Q7006 Q7009, Q7012 R7001, R7004 R7007	CN7003 D7011-D7014 CN7004	B7011
12H, 7 SEG AMBER	LTG-Y2K12M-01J	○	×	×
12/24H, 7 SEG GREEN	LTG-Y2K16M-J	○	×	×
4-DIG	×	×	○	○

##DIFFERENCE TABLE 4

JOG/SHUTTLE	R7009-R7014
WITH J/S	○
WITH ADV J/S	×
OTHERS	×

##DIFFERENCE TABLE 5

REC LINK	Q7013 R7008	D7009	D7010
YES	○	RED	×
NO	×	×	×

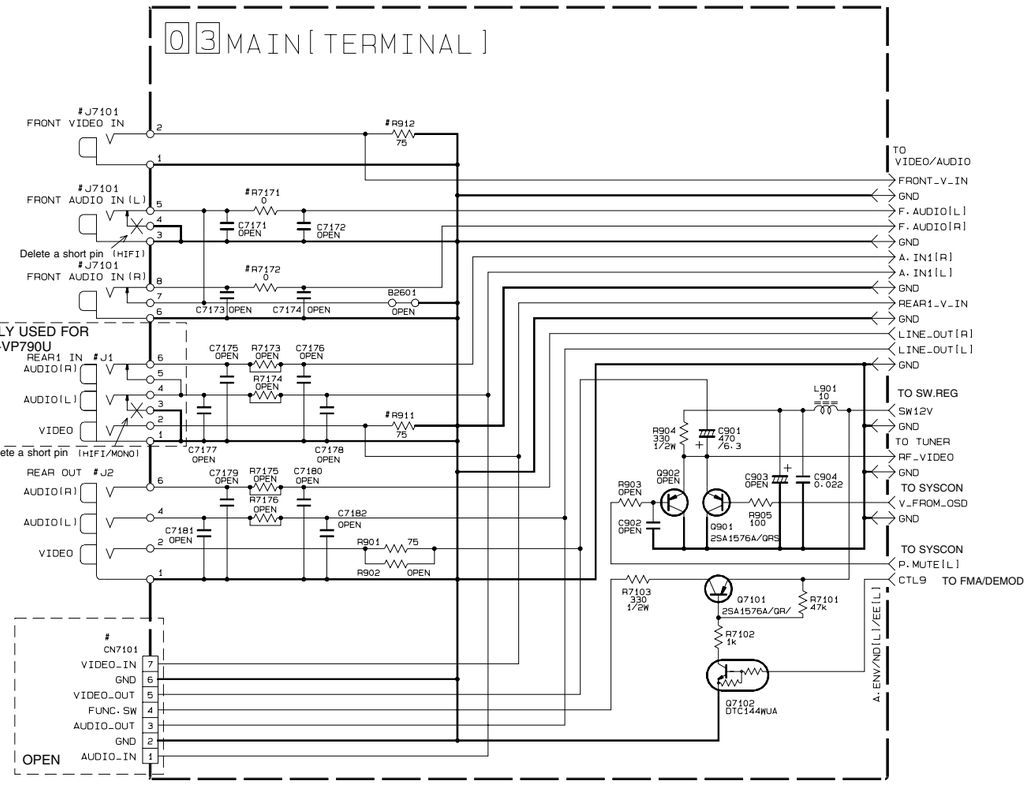
NOTES: UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

p20203001a_rev0

4.8 MAIN (TERMINAL) SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



#DIFFERENCE TABLE 1

OUTPUT	J2
HiFi	3P
MONO	2P

#DIFFERENCE TABLE 2

○ : Used
× : Not used

	INPUT	J1	J7101	R911	R912	R7171	R7172	CN7101
HiFi	FRONT	×	3P	×	○	○	○	×
	REAR	3P	×	○	×	×	×	×
	FRONT/REAR	3P	3P	○	○	○	○	×
MONO	FRONT	×	2P	×	○	×	○	×
	REAR	2P	×	○	×	×	×	×
	FRONT/REAR	2P	2P	○	○	×	○	×
	PERI CONNECTOR	×	×	×	×	×	×	○

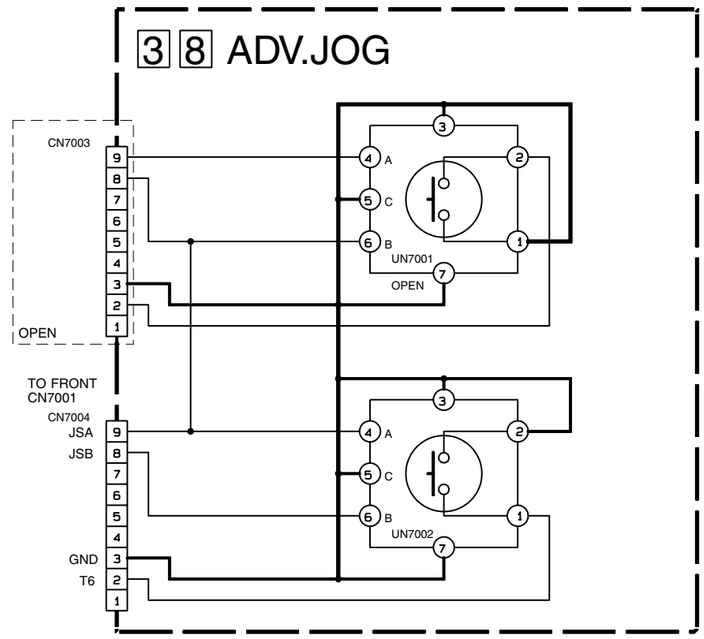
NOTES: UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

p40036001a_rev1

4.9 ADV. JOG SCHEMATIC DIAGRAM [HR-VP790U]

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



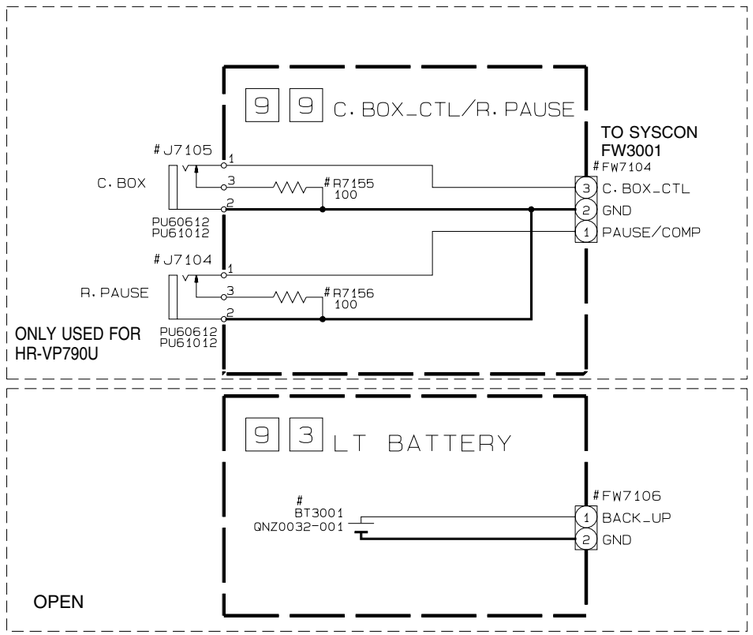
NOTES: UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

p40037001a_rev0

4.10 CONNECTION SCHEMATIC DIAGRAM

Note : The Parts Number, value and rated voltage etc. in the Schematic Diagram are for references only. When replacing the parts, refer to the Parts List.



○ : Used
× : Not used

JVC MODELS

		HR-VP793U HR-VP790U	HR-VP59U HR-A57U	HR-VP693U HR-VP690U 30370	HR-VP49U 30260 HR-J3008UM HR-A37U	HR-J6008UM HR-J7008UM HR-J4008UM	HR-J693M HR-J696M HR-J496M	HR-J696EN HR-J496EN	HR-J281MS HR-J287MS HR-J481MS HR-J481MS/S HR-J281MS/EA	HR-J387EM HR-J381EM	HR-J485EA HR-J285EA	HR-J278EU	HR-J485EE HR-J285EE
CABLE BOX CTL	J7105 R7155	○	×	×	×	×	×	×	×	×	×	×	×
R. PAUSE/AV_COMPU	J7104 R7156	○	×	×	×	×	×	×	×	×	×	×	×
	FW7104	○	×	×	×	×	×	×	×	×	×	×	×
LITHIUM BATTERY	BT3001 FW7106	×	×	×	×	○	○	○	○	○	○	×	○

PCEC/PHILIPS MODELS

		VR602/50 VR402/50 VR420/50	VR620/50	VR420/61	VR607/78 VR602/78 VR402/78	VR625/77 VR620/77	VR420/77	VR120/55 VR220/55 VR420/55 VR602/55	VR120/75 VR602/75 VR420/75 VR220/75
CABLE BOX CTL	J7105 R7155	×	×	×	×	×	×	×	×
R. PAUSE/AV_COMPU	J7104 R7156	×	×	×	×	×	×	×	×
	FW7104	×	×	×	×	×	×	×	×
LITHIUM BATTERY	BT3001 FW7106	×	○	○	×	○	×	×	×

AUDINAC MODELS

		AR-626 AR-424
CABLE BOX CTL	J7105 R7155	×
R. PAUSE/AV_COMPU	J7104 R7156	×
	FW7104	×
LITHIUM BATTERY	BT3001 FW7106	○

NOTES: UNLESS OTHERWISE SPECIFIED.
ALL RESISTANCE VALUES ARE IN OHMS.
ALL INDUCTANCE VALUES ARE IN H.
ALL CAPACITANCE VALUES ARE IN μF.

ELECTROLYTIC
CERAMIC
MYLER
NON POLAR

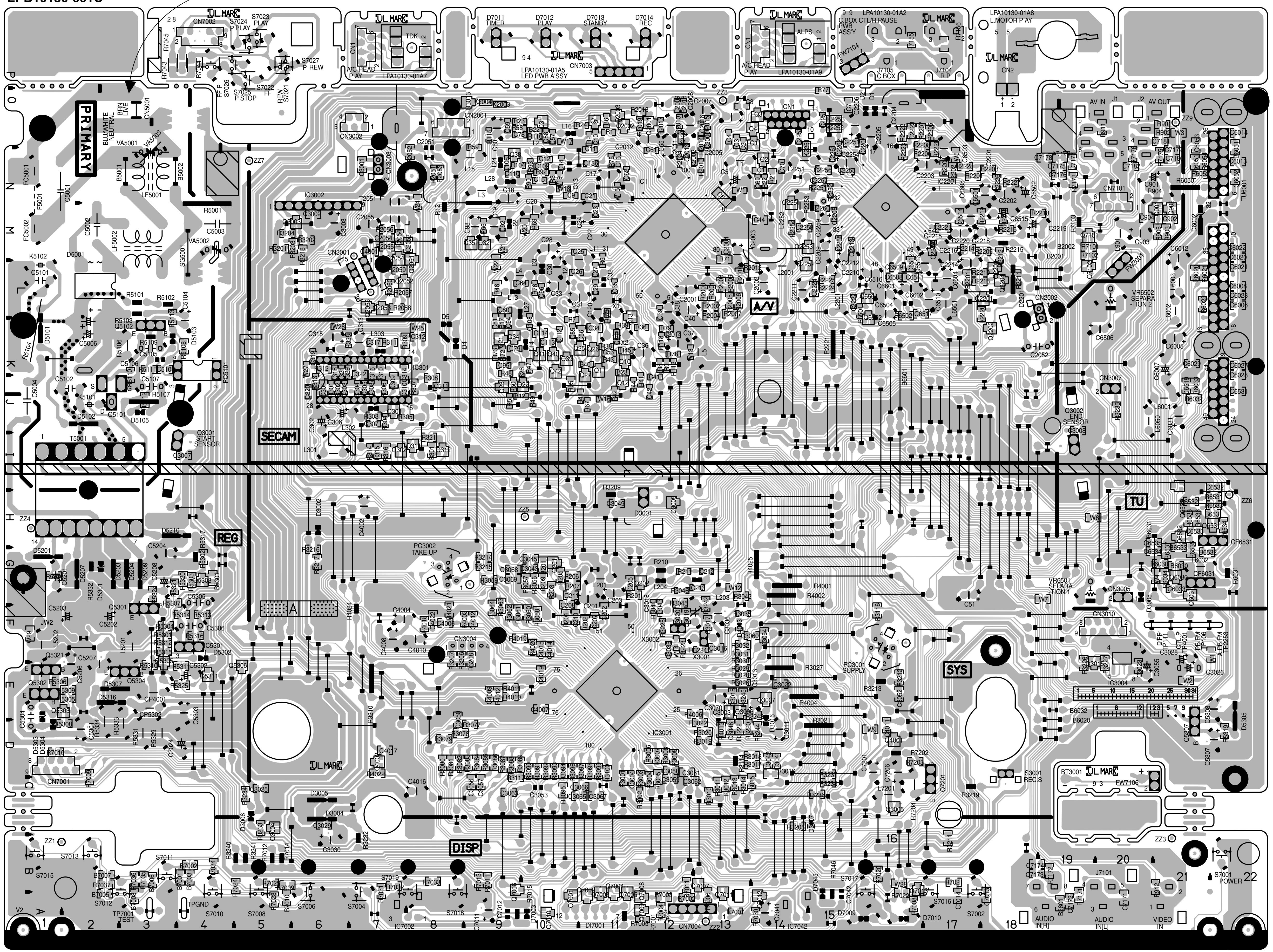
p30084001a_rev0

4.11 MAIN CIRCUIT BOARD

<03>MAIN
LPB10130-001C

DANGEROUS VOLTAGE

CAUTION :
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND RATED FUSE(S).
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE CP(S) MANUFACTURED BY ROHM.
ATTENTION :
REPLACER PAR DES FUSIBLE DE MEME TYPE.



PRIMARY
SECAM
REG
A/V
TU
SYS
DISP
LPA10130-01A7
LPA10130-01A5
LED PWB A'SSY
LPA10130-01A9
LPA10130-01A2
C.BOX CTL/R.PAUSE PWB ASS'Y
LPA10130-01A8
L.MOTOR P AY
Q3001 START SENSOR
Q3002 END SENSOR
PC3002 TAKE UP
PC3001 SUPPLY
VR6502 SEPARA-TION 2
VR6501 SEPARA-TION 1
AV IN
AV OUT
S7001 POWER
AUDIO IN[R]
AUDIO IN[L]
VIDEO IN

COMPONENT PARTS LOCATION GUIDE ＜MAIN＞

REF.NO.	LOCATION
CAPACITOR	
C1	B C 14N
C2	B C 13O
C3	B C 13O
C4	B C 13O
C5	A D 13N
C6	B C 13N
C7	B C 15O
C8	B C 13O
C9	B C 10N
C10	B C 11O
C11	B C 11N
C12	B C 10N
C13	A D 10N
C14	B C 10N
C15	B C 10N
C16	B C 11N
C17	A D 11N
C18	A D 9N
C19	A D 9M
C20	A D 10M
C21	B C 11N
C22	A D 11M
C23	B C 11M
C24	A D 10M
C25	B C 11M
C26	B C 10L
C27	B C 11L
C28	A D 10M
C29	B C 11L
C30	A D 10L
C31	A D 10L
C32	A D 11L
C33	A D 10L
C34	B C 11K
C35	B C 11L
C36	A D 12K
C37	A D 12K
C38	A D 12L
C39	B C 12L
C40	A D 13L
C41	B C 12J
C42	B C 12J
C44	B C 14M
C51	A D 17G
C53	B C 11K
C54	B C 11K
C55	B C 10K
C56	B C 11K
C57	B C 10O
C58	B C 10O
C59	B C 9O
C60	A D 9O
C61	B C 12N
C62	B C 11N
C63	B C 10L
C64	B C 10L
C65	A D 12N
C69	B C 14N
C70	B C 14N
C78	B C 9O
C79	B C 9K
C80	B C 9L
C81	B C 9K
C92	B C 9M
C94	B C 9K
C95	B C 9K
C96	B C 10L
C98	A D 9M
C106	B C 9N
C108	B C 10K
C109	B C 10N
C110	B C 9N
C112	B C 10K
C113	B C 10K
C114	B C 10K
C120	A D 11L
C136	B C 11N
C201	A D 11G
C202	B C 11F
C203	A D 11G
C205	B C 11G
C207	B C 11F
C208	B C 10G
C209	B C 10G
C210	B C 10F
C211	B C 10G
C212	B C 13G
C213	B C 13G
C301	B C 6J
C302	A D 6J
C303	B C 6J
C304	B C 7J
C305	B C 7J
C306	A D 7J
C307	B C 7J
C308	B C 7J
C309	B C 7J
C310	B C 7J
C311	B C 8J
C312	B C 8K
C313	A D 7K
C314	B C 7K
C315	A D 6K
C316	B C 7K
C317	B C 7K
C318	B C 6K
C319	B C 6K
C320	B C 6J
C321	B C 6K
C322	B C 7K
C901	A D 21N
C902	B C 21M
C903	A D 20M
C904	B C 20M
C2001	A D 12L
C2002	A D 14L
C2003	A D 13M
C2004	B C 13M
C2005	A D 13O
C2006	B C 13O
C2007	A D 13O
C2008	A D 12O
C2009	B C 12O
C2010	B C 12O
C2011	A D 12O
C2012	A D 12O
C2013	B C 12N
C2014	B C 12K
C2016	B C 13O
C2051	A D 8N
C2052	A D 19K
C2053	B C 8M
C2054	B C 7M
C2055	A D 7M
C2201	A D 18N
C2202	A D 18N
C2203	A D 16N
C2204	A D 16O
C2205	A D 16O
C2206	A D 15O
C2207	B C 15N
C2208	B C 15M
C2209	A D 15M
C2210	A D 15L
C2211	A D 14L
C2212	A D 15M
C2213	B C 15M
C2214	A D 17L
C2215	A D 17M
C2216	A D 17M
C2217	B C 17M
C2218	A D 18M
C2219	A D 18M
C2220	A D 17M
C2221	B C 17M
C2222	B C 15L
C2223	B C 16O
C2224	B C 15L
C2251	B C 15O
C2252	B C 15O
C2253	B C 14O
C2254	A D 15N
C2255	B C 15N
C2256	B C 15N
C2257	B C 15N
C2258	B C 14M
C2259	A D 15M
C2260	B C 15M
C2261	B C 15N
C2262	B C 15N
C3001	B C 7N
C3002	B C 6M
C3003	A D 6M
C3004	B C 11C
C3007	B C 4I
C3008	B C 19J
C3011	A D 14D
C3013	A D 14E
C3015	B C 13E
C3016	B C 13F
C3017	B C 13F
C3018	A D 13F
C3019	B C 12F
C3020	B C 12F
C3022	B C 14E
C3023	B C 20E
C3024	A D 4D
C3025	B C 5C
C3026	A D 21E
C3028	A D 21F
C3029	B C 6C
C3030	A D 6B
C3035	B C 12F
C3036	A D 13F
C3041	B C 14D
C3042	B C 14D
C3043	B C 10G
C3045	B C 10G
C3048	B C 13D
C3049	B C 11H
C3050	B C 8E
C3052	B C 16E
C3053	A D 10C
C3055	A D 20E
C3056	B C 9C
C3057	B C 9C
C3058	B C 12D
C3059	B C 12C
C3060	B C 14F
C3061	B C 12D
C3062	B C 12C
C3063	B C 9C
C3064	B C 14F
C3065	B C 11C
C3066	B C 11C
C3067	B C 11C
C3068	B C 9G
C3069	B C 9G
C3070	A D 13E
C4001	B C 7M
C4002	A D 7H
C4004	A D 7F
C4006	B C 8F
C4007	B C 10E
C4008	A D 7F
C4009	B C 9E

REF.NO.	LOCATION
CN3001	A D 7L
CN3002	A D 7O
CN3003	A D 7N
CN3004	A D 9F
CN3005	A D 20G
CN3007	A D 20J
CN3010	A D 20F
CN5001	A D 3O
CN7001	A D 2D
CN7002	A D 4P
CN7003	A D 12P
CN7004	A D 13A
CN7101	A D 20M
DIODE	
D1	A D 16O
D2	A D 16O
D3	A D 10M
D4	A D 8K
D5	A D 8K
D2201	A D 18L
D3001	A D 12H
D3002	A D 6H
D3004	A D 6C
D3005	A D 6C
D3006	A D 5C
D3007	B C 15C
D3008	A D 20G
D3009	B C 12H
D3013	B C 9O
D3015	B C 19E
D3016	A D 14E
D4003	B C 13F
D5001	B C 2L
D5101	A D 1K
D5102	A D 2J
D5103	A D 3K
D5105	A D 3J
D5201	A D 1G
D5203	A D 2G
D5204	A D 3G
D5207	A D 2G
D5209	A D 3G
D5210	A D 3H
D5301	A D 2G
D5302	A D 4F
D5303	A D 1D
D5304	A D 1E
D5305	A D 22D
D5307	A D 3E
D5316	A D 2E
D6002	A D 21M
D7003	A D 10A
D7009	A D 15A
D7010	A D 16A
D7011	A D 9P
D7012	A D 10P
D7013	A D 11P
D7014	A D 12P
D7043	A D 15A
IC	
IC1	B C 12M
IC301	A D 6K
IC2201	B C 16M
IC3001	B C 11E
IC3002	A D 5M
IC3003	B C 13E
IC3004	B C 20F
IC5301	A D 4F
IC7002	A D 8A
IC7042	A D 14A
J1	A D 20O
J2	A D 21O
J7101	A D 20A
J7104	A D 17P
J7105	A D 16P
COIL	
L1	A D 13N
L2	A D 10N
L3	A D 9N
L4	A D 9L
L5	A D 13K
L11	A D 11M
L12	A D 10L
L13	A D 10L
L14	A D 10K
L15	A D 8N
L16	A D 10O
L22	A D 9M
L24	A D 9N
L27	A D 9K
L28	A D 9N
L201	A D 11G
L203	A D 12G
L204	A D 12G
L301	A D 6I
L302	A D 7J
L303	A D 7K
L901	A D 20M
L2001	A D 14L
L2201	A D 15L
L2251	A D 14N
L2252	A D 14N
L5201	A D 3F
L5202	A D 1F
L6001	A D 21J
L6002	A D 21L
L6003	A D 21L
L6032	A D 22G
L6050	A D 20J
L6501	A D 17L
L7201	A D 16C

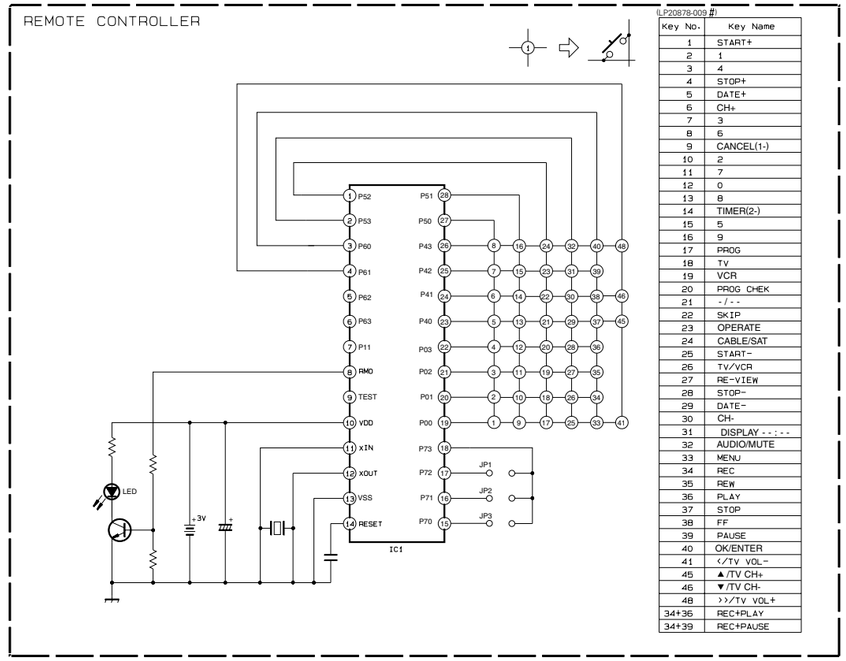
REF.NO.	LOCATION
TRANSISTOR	
Q1	B C 14O
Q2	B C 14N
Q3	B C 14O
Q4	B C 14O
Q5	B C 11O
Q10	B C 11K
Q11	B C 11K
Q12	B C 11J
Q13	B C 11L
Q21	B C 9K
Q22	B C 10J
Q23	B C 9J
Q25	B C 11K
Q26	B C 11K
Q27	B C 11K
Q31	B C 10O
Q32	B C 9M
Q34	B C 9K
Q35	B C 9M
Q38	B C 9N
Q39	B C 10K
Q40	B C 10K
Q41	B C 10K
Q42	B C 10K
Q201	B C 10G
Q202	B C 12G
Q301	B C 7J
Q302	B C 7I
Q311	B C 8I
Q312	B C 8I
Q901	B C 21M
Q902	B C 21M
Q2001	B C 12O
Q2002	B C 11O
Q2003	B C 11O
Q2051	B C 8M
Q2052	B C 7L
Q2053	B C 7L
Q2054	B C 7M
Q2055	B C 7L
Q2201	B C 18L
Q2202	B C 18K
Q2203	B C 18L
Q2204	B C 18L
Q2251	B C 14N
Q2252	B C 14L
Q2253	B C 15M
Q3001	A D 4I
Q3002	A D 19I
Q3003	B C 6M
Q3004	B C 5C
Q3005	B C 16C
Q3006	B C 13E
Q3007	B C 14E
Q4001	B C 16D
Q4002	B C 7D
Q5101	A D 2J
Q5102	A D 3K
Q5301	A D 3F
Q5302	A D 1E
Q5303	B C 2E
Q5304	A D 2E
Q5305	B C 3E
Q5306	B C 5E
Q5307	A D 21E
Q5308	B C 4G
Q5311	B C 4E
Q5321	A D 1E
Q6030	B C 21G
Q6031	B C 21G
Q6501	B C 16L
Q6502	B C 16L
Q6531	B C 22H
Q6532	B C 21H
Q6533	B C 21I
Q7001	B C 10A
Q7002	B C 11A
Q7003	B C 11A
Q7004	B C 11A
Q7005	B C 11A
Q7006	B C 9B
Q7007	B C 13B
Q7008	B C 12A
Q7009	B C 12A
Q7010	B C 10A
Q7011	B C 13A
Q7012	B C 14A
Q7013	B C 16B
Q7101	B C 19M
Q7102	B C 19L
Q7201	A D 17C
RESISTOR	
R1	B C 11O
R2	B C 11O
R3	B C 10N
R5	B C 9J
R6	B C 11M
R7	B C 10K
R8	B C 12K
R9	B C 12K
R12	A D 8N
R21	B C 14N
R22	B C 14N
R23	B C 9O
R24	B C 11O
R36	B C 12K
R37	B C 11L
R38	B C 11K
R39	B C 11K
R41	B C 12J
R42	B C 11J
R43	B C 11K
R44	B C 11J
R45	B C 11K
R46	B C 9L
R47	B C 10K
R48	B C 9K
R49	B C 10J
R50	B C 9J
R58	B C 9O
R59	B C 9N
R66	B C 9M
R67	B C 11J
R69	B C 10M
R71	B C 13M
R72	B C 9K
R73	B C 9K
R75	B C 11N
R76	B C 10L
R77	B C 15O
R78	B C 12K
R79	B C 12K
R90	B C 10N
R92	B C 10N
R93	B C 10N
R95	B C 10J
R104	B C 9N
R112	B C 12K
R115	B C 9O
R116	B C 10O
R118	B C 12K
R201	B C 11G
R202	B C 11F
R203	B C 10G
R204	B C 10F
R205	B C 10G
R206	B C 10G
R207	B C 10G
R210	A D 12G
R211	B C 12G
R301	B C 6J
R302	B C 6J
R303	B C 7J
R304	B C 7J
R305	B C 8J
R306	B C 7J
R307	B C 8J
R308	B C 8J
R309	B C 7K
R310	B C 7K
R311	B C 7K
R312	B C 6K
R313	B C 6J
R314	B C 7I
R315	B C 7I
R316	B C 7I
R321	B C 8I
R328	B C 7K
R329	B C 6K
R901	B C 21O
R902	B C 21O
R903	B C 21M
R904	A D 20N
R905	B C 21M
R911	B C 20O
R912	B C 21B
R2001	B C 13L
R2002	B C 13L
R2003	B C 13L
R2004	B C 13L
R2005	B C 13L
R2006	B C 13L
R2007	B C 13L
R2008	B C 13L
R2009	B C 13L
R2010	B C 13L
R2012	B C 14L
R2013	B C 13N
R2014	B C 13O
R2015	B C 13O
R2016	B C 12O
R2017	B C 12O
R2018	B C 12O
R2019	B C 12O
R2024	B C 12N
R2051	B C 8N
R2052	B C 8N
R2053	B C 8N
R2054	B C 7M
R2055	B C 7M
R2056	B C 7M
R2057	B C 7L
R2058	B C 7L
R2059	B C 7L
R2060	B C 7L
R2201	B C 17N
R2202	B C 17N
R2203	B C 18N
R2204	B C 17N
R2205	B C 17O
R2206	B C 16N
R2207	B C 16O
R2208	B C 16O
R2209	B C 18M
R2210	B C 17L
R2211	B C 18L
R2212	B C 18M
R2213	B C 17L
R2214	B C 17M
R2215	A D 18M
R2216	B C 18M
R2217	B C 18M
R2218	B C 19M
R2219	B C 18M
R2220	B C 18L
R2221	A D 15K
R2222	B C 16O
R2223	B C 16N
R2224	B C 15L
R2225	B C 15L
R2226	B C 18N
R2227	B C 18N
R2228	B C 17N
R2229	B C 17N
R2251	B C 15N
R2252	B C 15N
R2254	A D 15M
R2255	B C 15M
R2256	B C 14M
R2257	B C 14M
R2258	B C 15M
R2259	B C 15M
R2260	B C 15M
R2261	B C 15N
R2262	B C 15N
R3001	B C 11C
R3002	B C 12C
R3003	B C 12C
R3004	B C 12C
R3005	B C 12D
R3006	B C 12D
R3009	B C 12D
R3010	B C 13C
R3011	B C 13C
R3012	B C 13C
R3013	B C 13C
R3014	B C 13C
R3015	B C 14C
R3016	B C 14D
R3017	B C 14D
R3018	B C 14D
R3019	B C 13D
R3020	B C 13D
R3021	A D 15D
R3022	B C 13D
R3026	B C 13E
R3027	A D 14E
R3028	B C 13E
R3029	B C 13E
R3030	B C 13F
R3031	B C 13F
R3032	B C 13F
R3035	B C 13F
R3042	B C 13G
R3043	B C 12F
R3044	B C 12F
R3045	B C 12G
R3046	B C 12G
R3056	B C 10G
R3057	B C 10G
R3058	B C 10F
R3059	B C 9G
R3060	B C 10F
R3061	B C 9F
R3062	B C 9F
R3063	B C 9F
R3064	B C 9F
R3077	B C 9D
R3078	B C 8D
R3079	B C 8D
R3080	B C 8D
R3081	B C 8D
R3082	B C 8D
R3083	B C 9D
R3084	B C 9D
R3085	B C 9D
R3086	B C 9D
R3087	B C 9D
R3088	B C 9D
R3089	B C 9D
R3090	B C 10D
R3091	B C 10D
R3092	B C 10D
R3093	B C 10D
R3094	B C 10D
R3095	B C 10C
R3096	B C 10D
R3097	B C 11D
R3098	B C 11D
R3099	B C 11D
R3100	B C 11D
R3114	A D 13D
R3116	B C 16F
R3117	B C 9D
R3201	B C 5M
R3202	B C 6M
R3203	B C 6M
R3204	B C 5M
R3205	B C 14C
R3206	B C 8F
R3207	B C 8F
R3208	B C 9F
R3209	A D 11H
R3210	A D 7F
R3211	B C 17B
R3212	B C 16E
R3213	A D 16E
R3214	B C 9G
R3215	B C 9G
R3216	B C 6G
R3217	B C 6G
R3218	B C 6M
R3219	A D 17C
R3220	B C 13D
R3222	B C 13D
R3223	B C 12F
R3224	B C 13F
R3225	B C 12F
R3226	B C 19E
R3227	B C 20E
R3232	A D 7B
R3233	B C 5C
R3234	B C 5C
R3235	B C 20J
R3236	B C 15C
R3237	B C 15D
R3238	B C 15C
R3240	A D 5B
R3241	A D 5B
R3242	B C 13G
R3243	B C 14E
R3244	B C 14D
R3245	B C 13E
R4001	A D 14G
R4002	A D 14G
R4003	B C 9F
R4004	A D 15E
R4006	B C 13E
R4010	B C 9E
R4011	B C 9E
R4012	B C 9E
R4013	B C 13D
R4018	B C 8F
R4019	B C 9F
R4020	B C 10F
R4021	B C 8F
R4022	B C 7D
R4024	A D 7F
R4025	A D 14H
R5001	A D 4M
R5101	A D 3L
R5102	A D 3L
R5103	A D 3L
R5106	A D 3K
R5107	A D 3J
R5108	B C 4K
R5109	A D 3K
R5110	B C 3K
R5111	B C 3K
R5112	B C 3J
R5113	B C 3L
R5301	B C 3F
R5302	B C 4G
R5303	B C 4G
R5304	B C 3F
R5305	B C 2E
R5306	B C 1E
R5307	B C 3G
R5308	B C 2D
R5309	B C 2E
R5310	B C 3E
R5311	B C 4E
R5312	B C 3F
R5313	B C 4F
R5314	B C 4F
R5315	B C 3F
R5316	B C 4F
R5317	A D 4H
R5319	B C 22D
R5320	B C 4G
R5321	B C 3G
R5324	B C 3G
R5325	B C 4E
R5329	A D 3D
R5330	B C 1G
R5331	A D 3D
R5332	A D 2G
R5333	A D 3D
R5334	A D 2D
R6020	B C 21L
R6021	B C 21L
R6023	B C 21L
R6030	B C 21G
R6031	A D 22G
R6032	B C 21J
R6033	B C 21J
R6034	B C 21G
R6050	A D 21N
R6051	B C 21N
R6052	B C 21N
R6054	B C 21N
R6501	B C 15L
R6502	B C 16L
R6531	B C 22H
R6532	B C 21H
R6533	B C 22H
R6534	B C 22H
R6535	B C 21G
R6536	B C 21H
R6537	B C 21G
R6538	B C 21H
R7001	A D 11A
R7002	B C 12A
R7003	B C 12A
R7004	B C 12A
R7005	B C 12A
R7006	B C 13A
R7007	B C 16A
R7008	B C 16A
R7009	B C 2D
R7010	B C 1D
R7011	B C 9B
R7012	A D 5B
R7013	B C 9B
R7014	A D 9A
R7015	A D 9A
R7020	B C 16B
R7021	B C 17B
R7022	B C 16A
R7023	B C 5A
R7024	B C 5B
R7025	B C 5B
R7026	B C 14A
R7027	B C 7B
R7032	B C 7B
R7033	B C 8B
R7034	B C 4B
R7035	B C 3B
R7036	B C 3B
R7037	B C 2B
R7043	B C 3P
R7044	B C 4P
R7045	B C 4P
R7046	A D 15B
R7101	B C 19M
R7102	B C 19M
R7103	A D 19M
R7155	B C 16P
R7156	B C 17P
R7171	B C 19A
R7172	B C 19B
R7173	B C 19N
R7174	B C 19N
R7175	B C 21N
R7176	B C 20N
R7202	A D 16D
R7203	B C 16D
R7204	A D 16C
SWITCH	
S3001	A D 18C
S7001	A D 22B
S7002	A D 17B
S7004	A D 7B
S7006	A D 6B
S7008	A D 5B
S7010	A D 4B
S7011	A D 3B
S7012	A D 3B
S7013	A D 2B
S7015	A D 1B
S7016	A D 17B
S7017	A D 16B
S7018	A D 8B
S7019	A D 8B
S7021	A D 5P
S7022	A D 5P
S7023	A D 5P
S7024	A D 5P
S7025	A D 5P
S7026	A D 4P
S7027	A D 5P
OTHER	
BT3001	A D 19C
CF6031	A D 22G
CF6531	A D 22H
CP4001	A D 3E
CP5302	A D 3E
D7001	A D 12A
F5001	A D 1N
FC5001	A D 1N
FC5002	A D 1M
FW3001	A D 20M
FW7104	A D 15P
FW7106	A D 21D
JW1	A D 19F
JW2	A D 1F
K2001	B C 12O
K2002	B C 13N
K2003	B C 9O
K2004	B C 9O
K2251	B C 14N
K2252	B C 15O
K2253	B C 15O
K5101	A D 2J
K5102	A D 1L
LF5001	A D 3N
LF5002	A D 3L
PC06	B C 18P
PC07	B C 18P
PC016	B C 14P
PC016	B C 7P
PC017	B C 14P
PC017	B C 7P
PC018	B C 14P
PC018	B C 7P
PC019	B C 14P
PC019	B C 7P
PC020	B C 14P
PC020	B C 8P
PC021	B C 15P
PC021	B C 8P
PC022	B C 14P
PC022	B C 8P
PC02067	A D 2K
PC3001	A D 16F
PC3002	A D 8G
PC5101	A D 4K
SG5001	A D 4L
T2051	A D 7M
T5001	A D 1I
TP106	A D 21F
TP111	A D 20F
TP2253	A D 21F
TP4001	A D 21F
TP7001	A D 3A
TPGND	A D 4A
TU6001	A D 22O
VA5001	A D 3N
VA5002	A D 4M
VA5003	A D 3O
VR6501	A D 19G
VR6502	A D 20L
X1	A D 11L
X2	A D 11K
X3001	A D 13F
X3002	A D 12F

CONNECTOR	
CN1	A D 14O
CN1	A D 14P
CN1	A D 7P
CN2	A D 14P
CN2	A D 18O
CN2	A D 7P
CN3	A D 15P
CN3	A D 8P
CN4	A D 14P
CN4	A D 7P
CN2001	A D 9O
CN2002	A D 18L

4.12 REMOTE CONTROLLER SCHEMATIC DIAGRAM

[HR-VP690U]

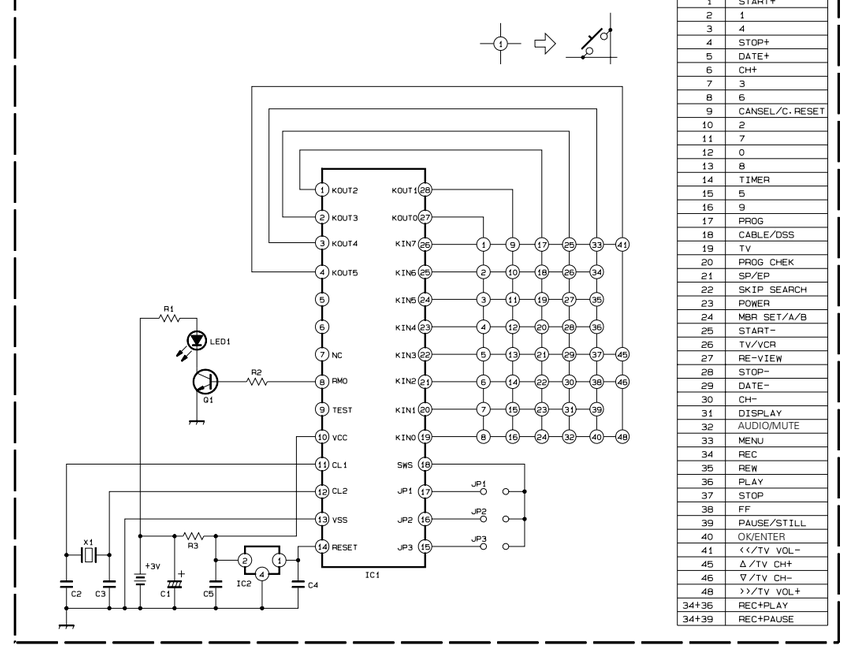
NOTES:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.



Key No.	Key Name
1	START+
2	1
3	4
4	STOP+
5	DATE+
6	CH+
7	3
8	6
9	CANCEL(1-)
10	2
11	7
12	0
13	8
14	TIMER(2-)
15	5
16	9
17	PROG
18	TV
19	VCR
20	PROG CHEK
21	-/--
22	SKIP
23	OPERATE
24	CABLE/SAT
25	START-
26	TV/VCR
27	RE-VIEW
28	STOP-
29	DATE-
30	CH-
31	DISPLAY
32	AUDIO/MUTE
33	MENU
34	REC
35	REW
36	PLAY
37	STOP
38	FF
39	PAUSE
40	OK/ENTER
41	＜/TV VOL-
45	▲/TV CH+
46	▼/TV CH-
48	＞/TV VOL+
34+36	REC+PLAY
34+39	REC+PAUSE

[HR-VP790U]

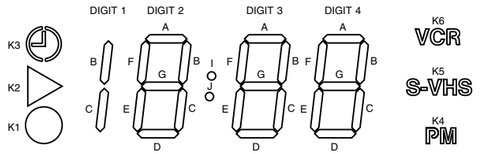
NOTES:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
   Avoid replacing individual parts.
   Replace the entire unit only.



Key No.	Key Name
1	START+
2	1
3	4
4	STOP+
5	DATE+
6	CH+
7	3
8	6
9	CANSEL/C.RESET
10	2
11	7
12	0
13	8
14	TIMER
15	5
16	9
17	PROG
18	CABLE/DSS
19	TV
20	PROG CHEK
21	SP/EP
22	SKIP SEARCH
23	POWER
24	MBR SET/A/B
25	START-
26	TV/VCR
27	RE-VIEW
28	STOP-
29	DATE-
30	CH-
31	DISPLAY
32	AUDIO/MUTE
33	MENU
34	REC
35	REW
36	PLAY
37	STOP
38	FF
39	PAUSE/STILL
40	OK/ENTER
41	＜/TV VOL-
45	Δ/TV CH+
46	∇/TV CH-
48	＞/TV VOL+
34+36	REC+PLAY
34+39	REC+PAUSE

4.13 FDP GRID ASSIGNMENT AND ANODE CONNECTION

GRID ASSIGNMENT



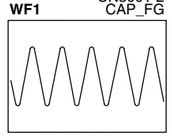
ANODE CONNECTION

No.	CONNECTION
1	CATHODE 2G, 3G, 4G, I, J
2	CATHODE 2F, 3F, 4F, K6
3	CATHODE 2E, 3E,4E, K1
4	CATHODE 2D, 3D, 4D, K4
5	CATHODE 1C, 2C, 3C, 4C, K5
6	CATHODE 1B, 2B, 3B, 4B, K2
7	CATHODE 2A, 3A, 4A, K3
8	COMMON ANODE K3, K2, K5, K4, K1, K6, I, J
9	COMMON ANODE DIGIT4
10	COMMON ANODE DIGIT3
11	COMMON ANODE DIGIT2
12	COMMON ANODE DIGIT1

4.14 WAVEFORMS

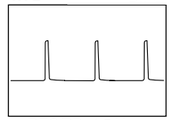
< SYSCON >

WF1 CN3001-2 CAP_FG



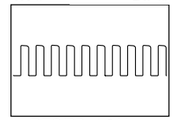
REC/PB 3.0 Vp-p
50 mV/0.5 msec/DIV

WF2 CN3002-4 D.PG



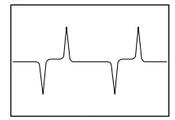
REC/PB 4.5 Vp-p
0.2 V/10 msec/DIV

WF3 CN3002-5 D.FG



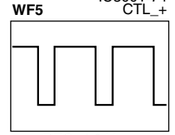
REC/PB 4.6 Vp-p
0.1 V/10 msec/DIV

WF4 TP4001 CTL.P



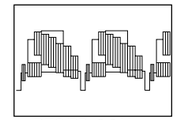
PB 4.1 Vp-p
50 mV/10 msec/DIV

WF5 IC3001-74 CTL_+



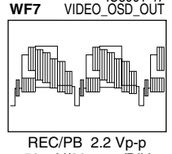
REC 4.0 Vp-p
0.1 V/10 msec/DIV

WF6 IC3001-49 V_TO_OSD



REC/PB 2.2 Vp-p
50 mV/20 µsec/DIV

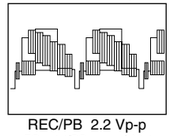
WF7 IC3001-47 VIDEO_OSD_OUT



REC/PB 2.2 Vp-p
50 mV/20 µsec/DIV

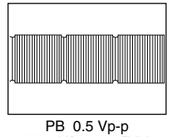
< VIDEO >

WF1 IC1-27



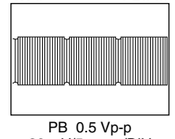
REC/PB 2.2 Vp-p
50 mV/20 µsec/DIV

WF2 IC1-1



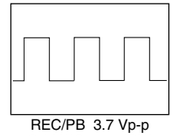
PB 0.5 Vp-p
20 mV/5 msec/DIV

WF3 TP106 PB.FM



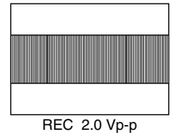
PB 0.5 Vp-p
20 mV/5 msec/DIV

WF4 TP111 D.FF



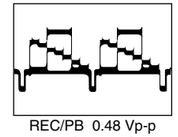
REC/PB 3.7 Vp-p
0.1 V/10 msec/DIV

WF5 IC1-85



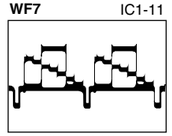
REC 2.0 Vp-p
50 mV/5 msec/DIV

WF6 IC1-13



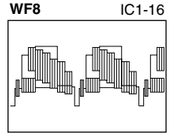
REC/PB 0.48 Vp-p
20 mV/20 µsec/DIV

WF7 IC1-11



REC/PB 0.48 Vp-p
20 mV/20 µsec/DIV

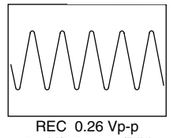
WF8 IC1-16



REC 1.0 Vp-p
20 mV/20 µsec/DIV

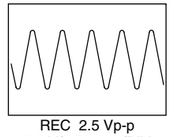
< AUDIO >

WF1 IC2201-9



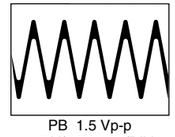
REC 0.26 Vp-p
0.1 V/0.5 msec/DIV

WF2-1 IC2201-53



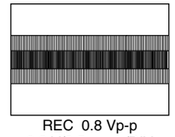
REC 2.5 Vp-p
0.5 V/0.5 msec/DIV

WF2-2 IC2201-53



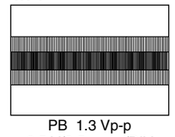
PB 1.5 Vp-p
0.5 V/0.5 msec/DIV

WF3 IC2201-21



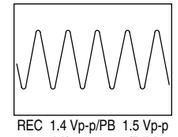
REC 0.8 Vp-p
0.2 V/0.5 msec/DIV

WF4 TP2253 A.PB.FM



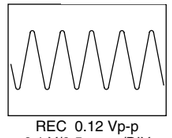
PB 1.3 Vp-p
0.5 V/0.5 msec/DIV

WF5 IC1-53



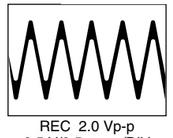
REC 1.4 Vp-p/PB 1.5 Vp-p
0.5 V/0.5 msec/DIV

WF6 IC1-63



REC 0.12 Vp-p
0.1 V/0.5 msec/DIV

WF7 IC1-99



REC 2.0 Vp-p
0.5 V/0.5 msec/DIV

4.15 VOLTAGE CHARTS

<MAIN>

MODE PIN NO.	REC	PLAY
IC1		
1	1.5	2.3
2	2.8	2.8
3	2.6	2.6
4	1.9	1.5
5	1.9	1.5
6	2.4	2.1
7	1.4	0.8
8	0	0
9	2.6	3.1
10	2.3	2.3
11	3.1	3.1
12	2.8	2.8
13	3.1	3.1
14	2.3	2.3
15	0	0
16	2.8	2.8
17	1.4	1.4
18	2.8	2.8
19	2.8	2.8
20	2.8	2.8
21	2.0	2.0
22	2.8	2.8
23	2.8	2.8
24	5.0	5.0
25	0.4	0.4
26	0	0
27	2.3	2.3
28	2.3	2.3
29	1.9	1.9
30	2.1	2.1
31	0	0
32	2.5	2.5
33	5.0	5.0
34	2.7	2.3
35	5.0	5.0
36	2.5	0
37	2.3	2.3
38	-	-
39	1.2	1.2
40	-	-
41	2.5	2.5
42	-	-
43	0	0
44	2.2	2.2
45	4.6	4.6
46	4.9	4.6
47	2.9	2.9
48	2.6	2.6
49	5.0	5.0
50	2.5	2.5
51	2.8	2.8
52	0	0
53	2.6	2.6
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65	2.0	2.0
66	0	0
67	0	0
68	0	0
69	0	0
70	0	0
71	0	0
72	0	0
73	3.1	3.1
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	5.0	5.0
80	5.0	5.0
81	0	0
82	0	0
83	0	0
84	2.2	2.2
85	2.4	2.4
86	2.2	2.2
87	5.0	5.0
88	0	0
89	0	0
90	0	0
91	0	4.0
92	2.6	2.6
93	0.8	0.5
94	0	0
95	2.5	2.5
96	2.5	2.5
97	2.5	2.5
98	0	0
99	2.5	2.5
100	0	0

MODE PIN NO.	REC	PLAY
IC2201		
1	2.4	2.4
2	0	0
3	2.4	2.4
4	0	0
5	2.3	2.3
6	2.5	2.5
7	2.0	2.0
8	0.4	0.4
9	0	0
10	0	0
11	0	0
12	2.0	2.0
13	2.2	2.2
14	0	0
15	0	0
16	2.5	2.5
17	0.7	0.7
18	2.4	2.4
19	2.5	0
20	2.0	0
21	1.9	0
22	2.0	0.7
23	0	0
24	2.0	0.7
25	5.0	5.0
26	2.0	0
27	0	0
28	4.3	2.2
29	4.4	1.9
30	4.9	1.0
31	1.1	1.9
32	2.5	2.5
33	2.5	2.5
34	0.7	0.7
35	2.6	2.6
36	0	0
37	1.6	1.6
38	0	0
39	0	0
40	5.0	5.0
41	0	0
42	5.0	5.0
43	4.9	4.9
44	2.3	2.3
45	0	0
46	3.6	3.6
47	1.5	1.5
48	2.2	2.2
49	3.5	3.5
50	3.5	0
51	0	5.0
52	3.5	0
53	4.4	0
54	2.4	0
55	0	0
56	0	0
57	4.4	0
58	9.3	9.3
59	4.4	4.4
60	0	0
61	2.5	2.5
62	2.4	0
63	2.4	2.4
64	0.5	0.8
IC3001		
1	-	-
2	-	-
3	0	0
4	5.0	0
5	5.1	5.0
6	4.0	4.0
7	4.0	4.0
8	4.1	4.1
9	4.0	4.0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	5.0	5.0
16	4.9	4.9
17	4.9	4.9
18	4.5	4.5
19	0	0
20	0	0
21	2.8	2.8
22	4.3	4.3
23	2.5	2.5
24	0	0
25	-	-
26	0	2.5
27	5.0	0
28	5.1	5.0
29	1.0	1.0
30	4.9	0
31	5.0	5.0
32	4.1	4.1
33	2.5	2.5
34	1.5	1.5
35	0	0

MODE PIN NO.	REC	PLAY
36	5.0	5.0
37	-	-
38	-	-
39	0	0
40	-	-
41	-	-
42	0	0
43	5.0	5.0
44	0	0
45	5.0	5.0
46	4.6	4.6
47	1.6	1.6
48	0	0
49	1.6	1.6
50	2.4	2.4
51	5.0	5.0
52	2.5	2.5
53	2.5	2.5
54	0	0
55	0	0
56	4.5	4.9
57	4.8	4.8
58	2.0	0
59	5.0	0
60	1.9	3.9
61	0	0
62	5.1	5.1
63	5.1	5.1
64	5.1	5.1
65	2.8	2.8
66	0	0.4
67	2.5	2.5
68	2.5	2.5
69	2.5	2.5
70	2.5	2.5
71	0	0
72	2.4	2.4
73	5.0	5.0
74	3.0	2.5
75	0	2.5
76	2.5	2.5
77	0	0
78	0	0
79	0	0
80	1.1	1.1
81	0	0
82	0	3.6
83	0	1.9
84	4.9	4.9
85	5.1	5.1
86	0	5.1
87	0	0
88	0	0
89	1.0	0
90	5.1	5.1
91	0	0
92	0	0
93	0	0
94	5.0	5.0
95	0	0
96	1.0	0
97	0	0
98	1.9	0
99	0	0
100	0	0
IC3002		
1	7.5	7.5
2	0.5	0.5
3	0	0
4	0.5	0.5
5	11.9	11.9
6	11.9	11.9
7	0	0
8	0	0
9	0	0
IC3004		
1	0	0
2	0	0
3	0	0
4	0	0
5	4.8	4.8
6	4.9	4.9
7	0	0
8	5.1	5.1
IC5301		
1	2.5	2.5
2	0	0
3	4.5	4.5
IC7002	-	-
CN1		
1	0	0
2	0	0
3	0	0
4	0	0
5	2.3	2.3
6	2.4	2.2
7	2.4	2.4
8	2.4	2.4
9	2.0	0
10	2.0	0
11	1.9	0

MODE PIN NO.	REC	PLAY
CN2001		
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	2.4	2.4
7	2.7	2.7
CN2002		
1	0	0
2	0	0
CN3001		
1	0	5.0
2	2.5	2.5
3	2.5	2.5
4	5.0	0
5	0	0
6	5.0	5.0
7	0	0
8	11.9	11.9
CN3002		
1	11.9	11.9
2	0	0
3	1.3	1.3
4	0.4	0.4
5	2.8	2.8
CN3003		
1	1.0	1.0
2	1.0	1.0
CN3004		
1	5.1	5.1
2	5.1	5.1
3	0	0
4	0	0
CN7001	-	-

<MINI FRONT>[HR-VP690U]

MODE PIN NO.	REC	PLAY
CN7002	-	-

<ADV.JOG>[HR-VP790U]

MODE PIN NO.	REC	PLAY
CN7004	-	-

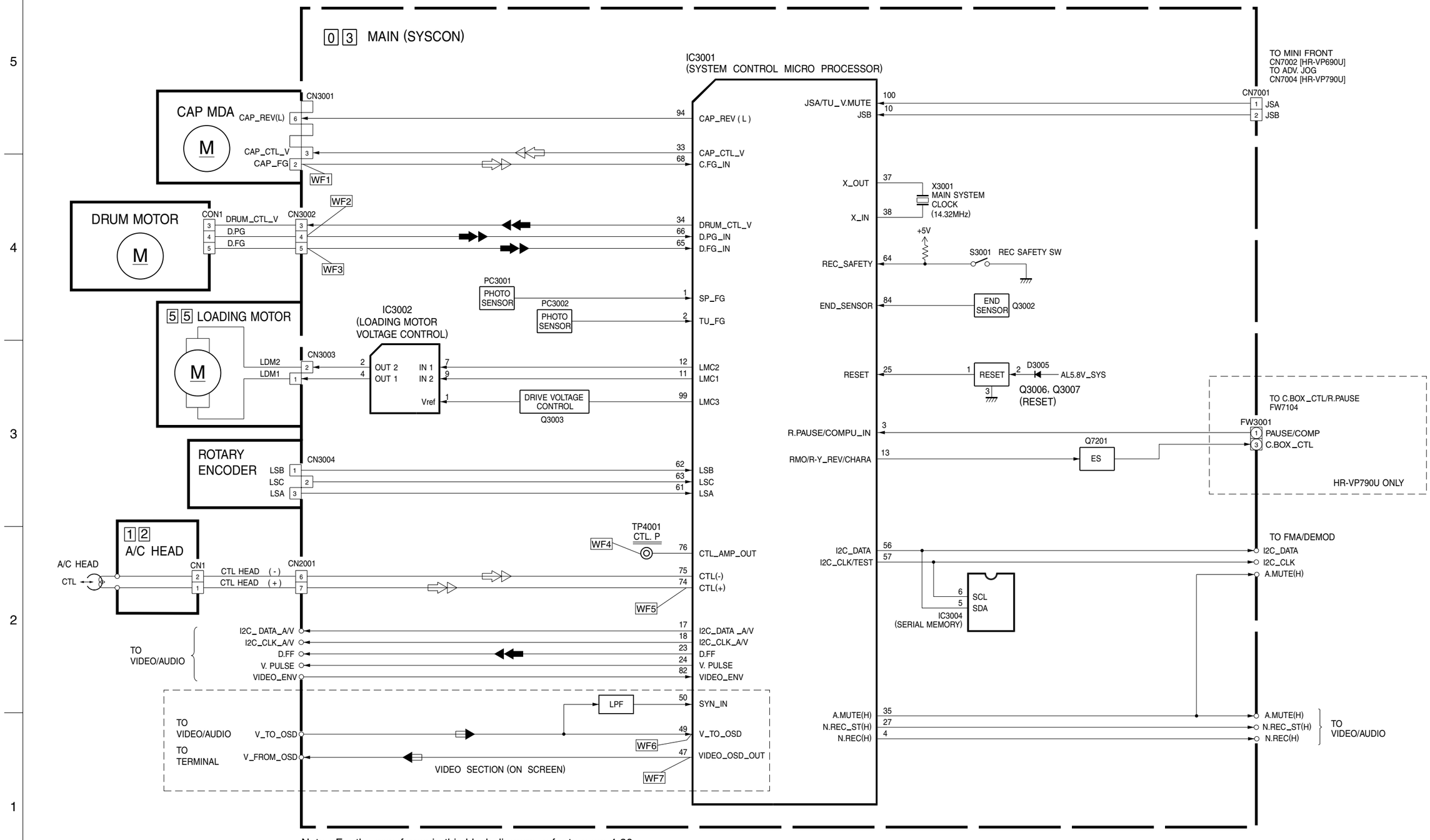
4.16 CPU PIN FUNCTION

<SYSCON IC3001>

PIN NO.	LABEL	IN/OUT	FUNCTION
1	SP_FG	IN	DETECTION SIGNAL FOR SUPPLY REEL ROTATION/TAPE REMAIN
2	TU_FG	IN	DETECTION SIGNAL FOR TAKE-UP REEL ROTATION/TAPE REMAIN
3	R.PAUSE/COMPU_IN	IN	REMOTE PAUSE CONTROL/A/V COMPULINK INPUT
4	N.REC(H)	OUT	NORMAL AUDIO REC MODE CONTROL (REC:H)
5	RC	IN	REMOTE CONTROL DATA INPUT
6	DIG2	OUT	LED DRIVE
7	DIG1	OUT	LED DRIVE
8	DIG4	OUT	LED DRIVE
9	DIG5	OUT	LED DRIVE
10	JSB	IN	INPUT FOR THE JOG SHUTTLE
11	LMC1	OUT	LOADING MOTOR DRIVE(1)
12	LMC2	OUT	LOADING MOTOR DRIVE(2)
13	RMO/R-Y_REV/CHARA	OUT	REMOTE CONTROL OUTPUT FOR CABLE BOX/NC/NC
14	POWER_DET	-	NC
15	CONV_CTL(H)/MESECAM(H)	OUT	R/F CONVERTER ON/OFF (ON:H, OFF:L)/NC
16	CTL_GAIN	OUT	CONTROL AMP OUT FREQUENCY RESPONSE SWITCHING
17	I2C_DATA_A/V	IN/OUT	SERIAL DATA TRANSFER OUTPUT FOR THE VIDEO/AUDIO IC
18	I2C_CLK_A/V	OUT	SERIAL DATA TRANSFER CLOCK FOR THE VIDEO/AUDIO IC
19	SP_SHORT(H)	-	NC
20	EP_SHORT(H)	-	NC
21	SB_GAIN	OUT	VOLTAGE CONTROL SIGNAL FOR VIDEO FREQUENCY RESPONSE
22	CH_SW	IN	RF CHANNEL SWITCHING
23	D.FF	OUT	ROTATION DETECTION SIGNAL FOR DRUM MOTOR/TIMING CONTROL SIGNAL FOR REC
24	V.PULSE	OUT	V.PULSE ADDITION TIMING CONTROL
25	RESET	-	RESET TERMINAL
26	A.FF/SECAM_DET	OUT	AUDIO FF OUTPUT/NC
27	N.REC_ST(H)	OUT	NORMAL AUDIO SOUND RECORDING START
28	TU_I2C_CLK	OUT	SERIAL DATA TRANSFER CLOCK FOR THE TUNER UNIT
29	D_B	OUT	LED DRIVE
30	H.REC_ST(H)/SECAM(H)	OUT	Hi-Fi AUDIO SOUND RECORDING START
31	TU_MUTE(H)	-	NC
32	DIG3	OUT	LED DRIVE
33	CAP_CTL_V	OUT	CAPSTAN MOTOR CONTROL
34	DRUM_CTL_V	OUT	DRUM MOTOR CONTROL
35	A.MUTE(H)	OUT	AUDIO MUTE CONTROL (MUTE ON:H)
36	VDD	-	SYSTEM POWER
37	X_OUT	-	MAIN SYSTEM CLOCK (14.32MHz)
38	X_IN	-	MAIN SYSTEM CLOCK (14.32MHz)
39	VSS	-	GND
40	XC_IN	-	NC
41	XC_OUT	-	NC
42	Sxi	-	NC
43	P.MUTE(L)	-	NC
44	3.58NTSC(L)/POWER_SAVE(H)	-	NC
45	SYNC_DET	-	NC
46	PROTECT	IN	DETECTION SIGNAL FOR SWITCHING POWER SUPPLY
47	VIDEO_OSD_OUT	OUT	COMPOSITE VIDEO SIGNAL OUTPUT
48	VSS2	-	GND
49	V_TO_OSD	IN	COMPOSITE VIDEO SIGNAL INPUT
50	SYN_IN	IN	COMPOSITE SYNCHRONIZING SIGNAL FOR SERVO, VERTICAL SYNCHRONIZING SIGNAL FOR OSD

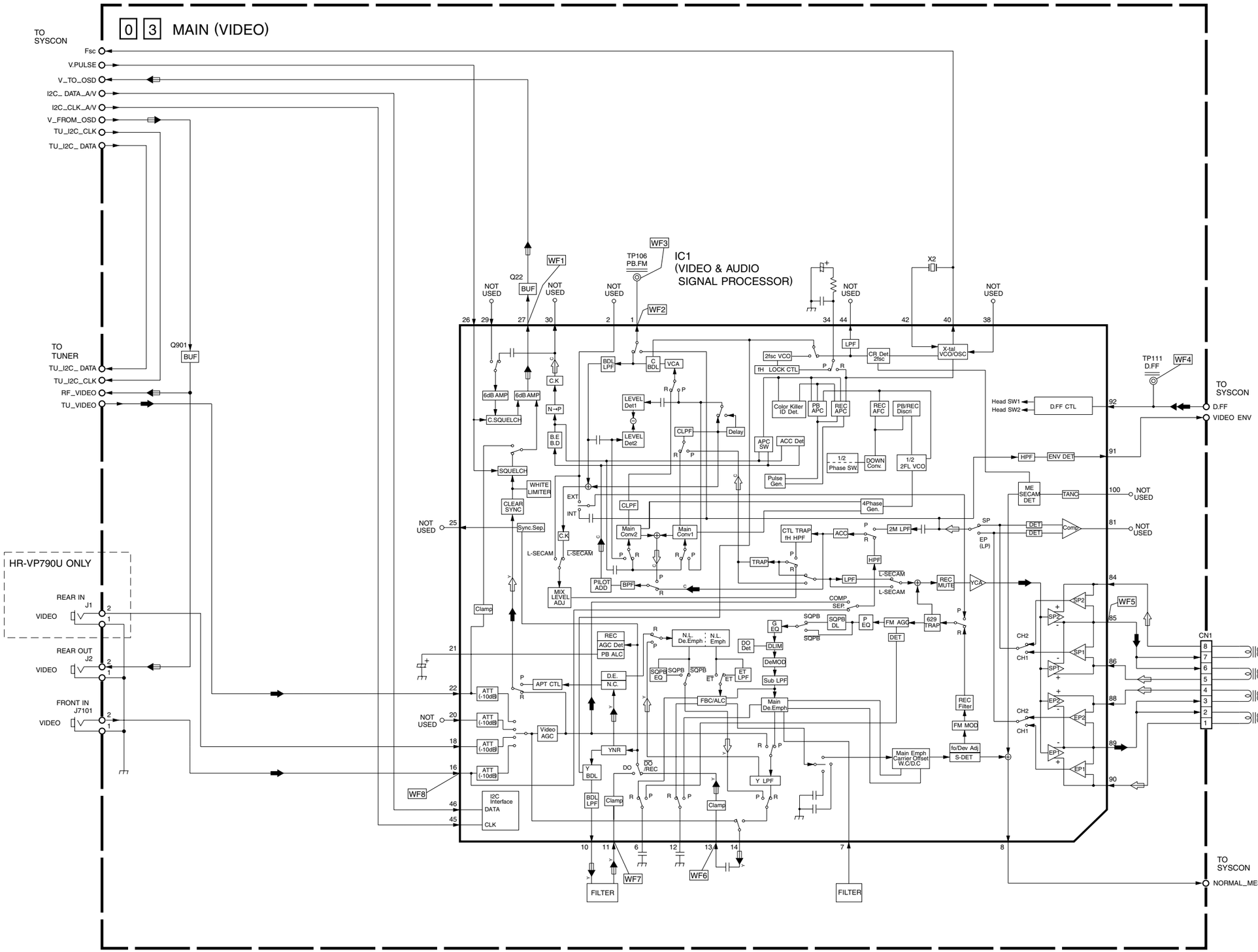
PIN NO.	LABEL	IN/OUT	FUNCTION
51	VDD2	-	SYSTEM POWER
52	AFCC	IN	FILTER INPUT FOR HORIZONTAL SYNCHRONIZING OF OSD CHARACTER
53	AFCLPF	OUT	FILTER OUTPUT FOR HORIZONTAL SYNCHRONIZING OF OSD CHARACTER
54	FSCI	IN	FSC INPUT FOR OSD
55	FSCLPF	OUT	FSC OUTPUT FOR OSD
56	I2C_DATA	IN/OUT	SERIAL DATA TRANSFER OUTPUT FOR MEMORY IC
57	I2C_CLK/TEST	OUT	SERIAL DATA TRANSFER CLOCK FOR MEMORY IC/MECHANISM TEST SIGNAL
58	D_F	OUT	LED DRIVE
59	P.CTL(H)	OUT	CONTROL SIGNAL FOR SWITCHING POWER SUPPLY
60	D_G	OUT	LED DRIVE
61	LSA	IN	MECHANISM MODE DETECT(A)
62	LSB	IN	MECHANISM MODE DETECT(B)
63	LSC	IN	MECHANISM MODE DETECT(C)
64	REC_SAFETY	IN	REC SAFETY SWITCH DETECT (SW ON:L)
65	D.FG_IN	IN	DRUM FG PULSE INPUT
66	D.PG_IN	IN	DRUM PICKUP PULSE INPUT (SWITCHING PULSE)
67	C.FG_AMP_OUT	OUT	SET-UP OUTPUT FOR CAPSTAN FG AMPLIFICATION FACTOR
68	C.FG_IN	IN	CAPSTAN FG PULSE INPUT
69	AMP_VREF_OUT	OUT	AMP CIRCUIT REFERENCE VOLTAGE OUTPUT
70	AMP_VREF_IN	IN	AMP CIRCUIT REFERENCE VOLTAGE INPUT
71	AVSS	-	GND FOR ANALOG CIRCUIT
72	AMP_C	IN	CAPACITOR CONNECT TERMINAL FOR CTL AMP CIRCUIT
73	AVCC	-	SYSTEM POWER FOR ANALOG CIRCUIT
74	CTL(+)	IN/OUT	CTL(+) SIGNAL
75	CTL(-)	IN/OUT	CTL(-) SIGNAL
76	CTL_AMP_OUT	OUT	CTL PULSE OUTPUT
77	LOCK(L)	-	NC
78	AGC_CTL/SW1	OUT	DETECTION SIGNAL FOR AGC/NC
79	START_SENSOR	-	NC
80	AFC/JUST_CLK	IN	TUNING CHECK/NC
81	LED/SW2	IN	SAP DETECT/NC
82	VIDEO_ENV	IN	AUTO TRACKING DETECT/INPUT THE AVERAGE OF PLAYBACK VIDEO SIGNAL
83	A.ENV/ND(L)/EE(L)	IN	AUDIO PB FM ENV. INPUT/NON HiFi MODEL:L/NC
84	END_SENSOR	IN	END SENSOR
85	KEY1	IN	OPERATION CONTROL SIGNAL
86	KEY2	IN	OPERATION CONTROL SIGNAL
87	KILLER_DET/COMPU_OUT/PAL_PB	-	NC/NC/NC
88	NORMAL_MESECAM/S	IN	NC/SQPB DETECT
89	D_A	OUT	LED DRIVE
90	TU_I2C_DATA	IN/OUT	I/O DATA FOR THE TUNER UNIT
91	J4	-	NC
92	J5/V.UP(H)	-	NC/NC
93	J6	-	NC
94	CAP_REV(L)	OUT	CAPSTAN MOTOR REVERSE CONTROL (FWD:H/REV:L)
95	J3/REC_LINK	-	NC/NC
96	D_C	OUT	LED DRIVE
97	D_D	OUT	LED DRIVE
98	D_E	OUT	LED DRIVE
99	LMC3	OUT	LOADING MOTOR DRIVE(3)
100	JSA/TU_V.MUTE	-	NC/NC

4.17 SYSTEM CONTROL BLOCK DIAGRAM



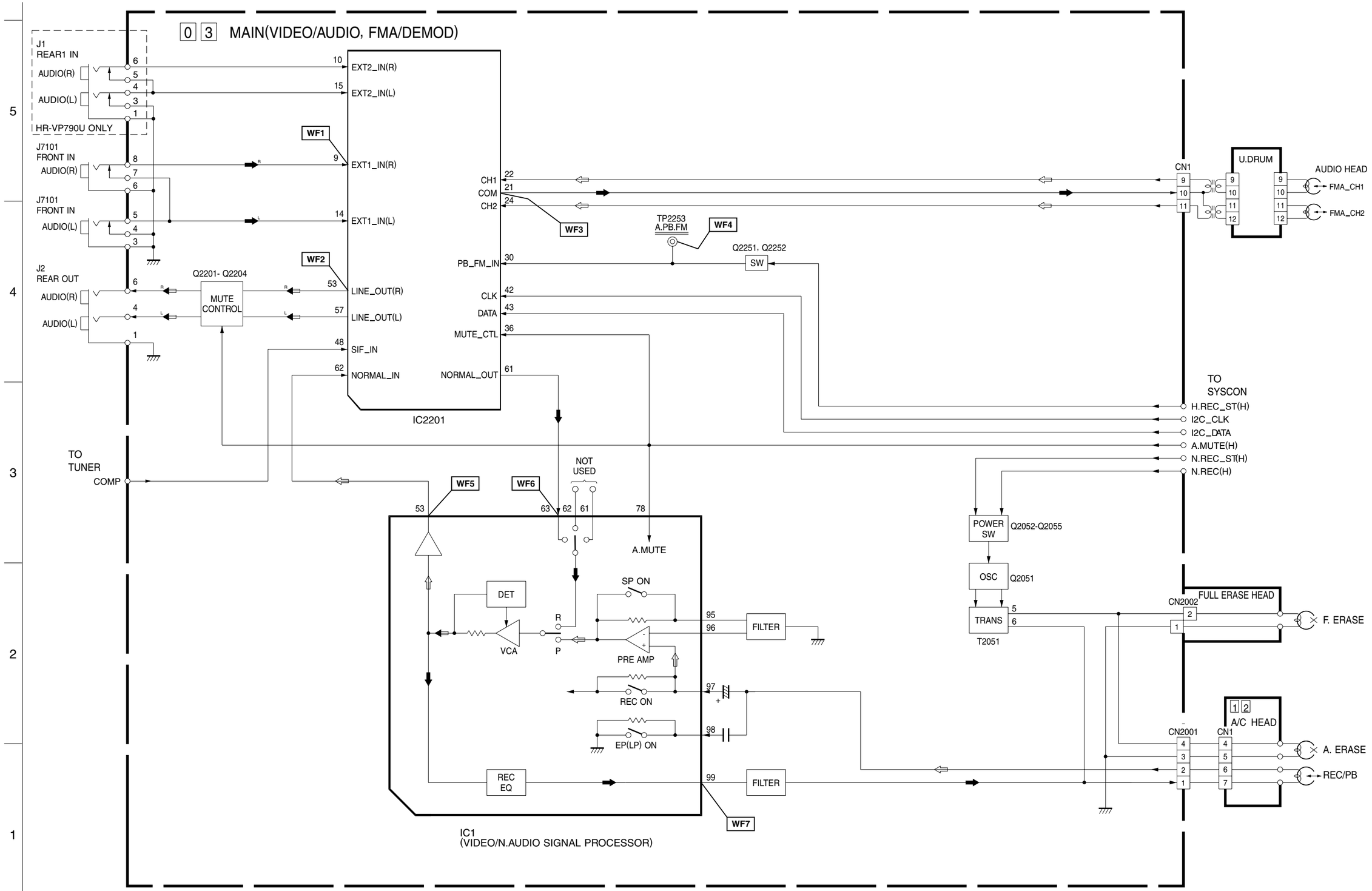
Note : For the waveforms in this block diagram, refer to page 4-26.

4.18 VIDEO BLOCK DIAGRAM



Note : For the waveforms in this block diagram, refer to page 4-26.

4.19 AUDIO BLOCK DIAGRAM



Note : For the waveforms in this block diagram, refer to page 4-26.

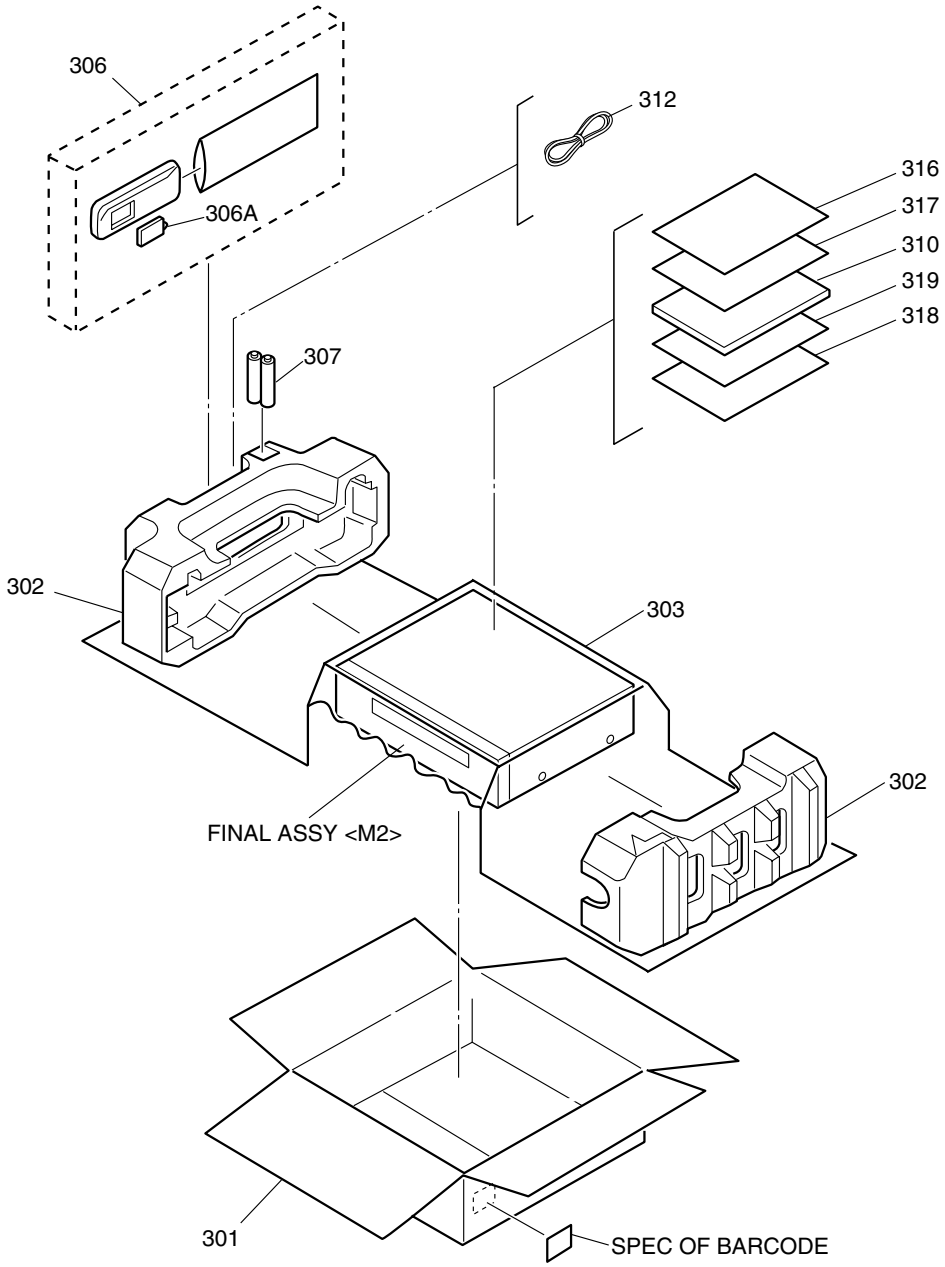
SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

5.1 PACKING AND ACCESSORY ASSEMBLY <M1>

The instruction manual to be provided with this product will differ according to the destination.



#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION

****

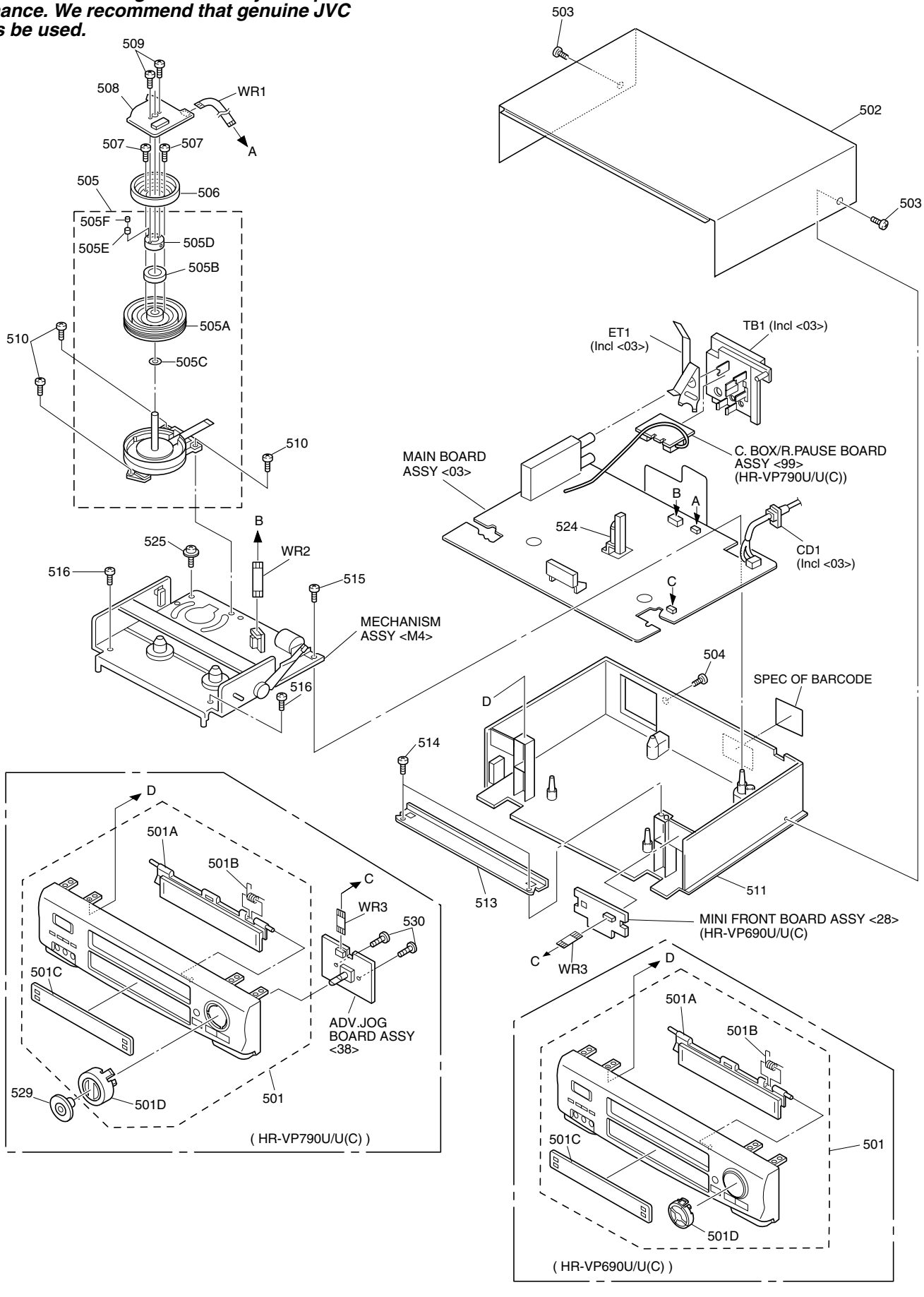
PACKING AND ACCESSORY ASSEMBLY <M1>

	301	LP30881-001A	PACKING CASE,VP790U/U(C)
		LP30881-005A	PACKING CASE,VP690U/U(C)
	302	LP30777-001C	CUSHION ASSY
	303	LP30904-002A	SHEET
	306	LP20303-015A	REMOTE CONTROLLER,VP790U/U(C)
		LP20878-009A	REMOTE CONTROLLER,VP690U/U(C)
	306A	LP40225-002A	COVER(BATTERY),VP790U/U(C)
		LP40610-001A	COVER(BATTERY),VP690U/U(C)
	307	–	BATTERY,X2("AA"TYPE)
⚠	310	LPT0499-001A	INST.BOOK(EN),VP690U/U(C)
⚠		LPT0499-003A	INST.BOOK(FR),VP690U(C)
⚠		LPT0501-001B	INST.BOOK(EN),VP790U/U(C)
⚠		LPT0501-003B	INST.BOOK(FR),VP790U(C)
	312	PEAC0294-04	RF CABLE
	316	BT-52004-1	WARRANTY CARD,VP690U(C)/VP790U(C)
	317	BT-51020-2	REGIST.CARD,VP690U/VP790U
	318	LP30666-002A	SHEET(COUPON),VP790U/U(C)
	319	BT-20071B	SER.NET CARD,VP690U(C)/VP790U(C)

5.2 FINAL ASSEMBLY <M2>

BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.



#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION

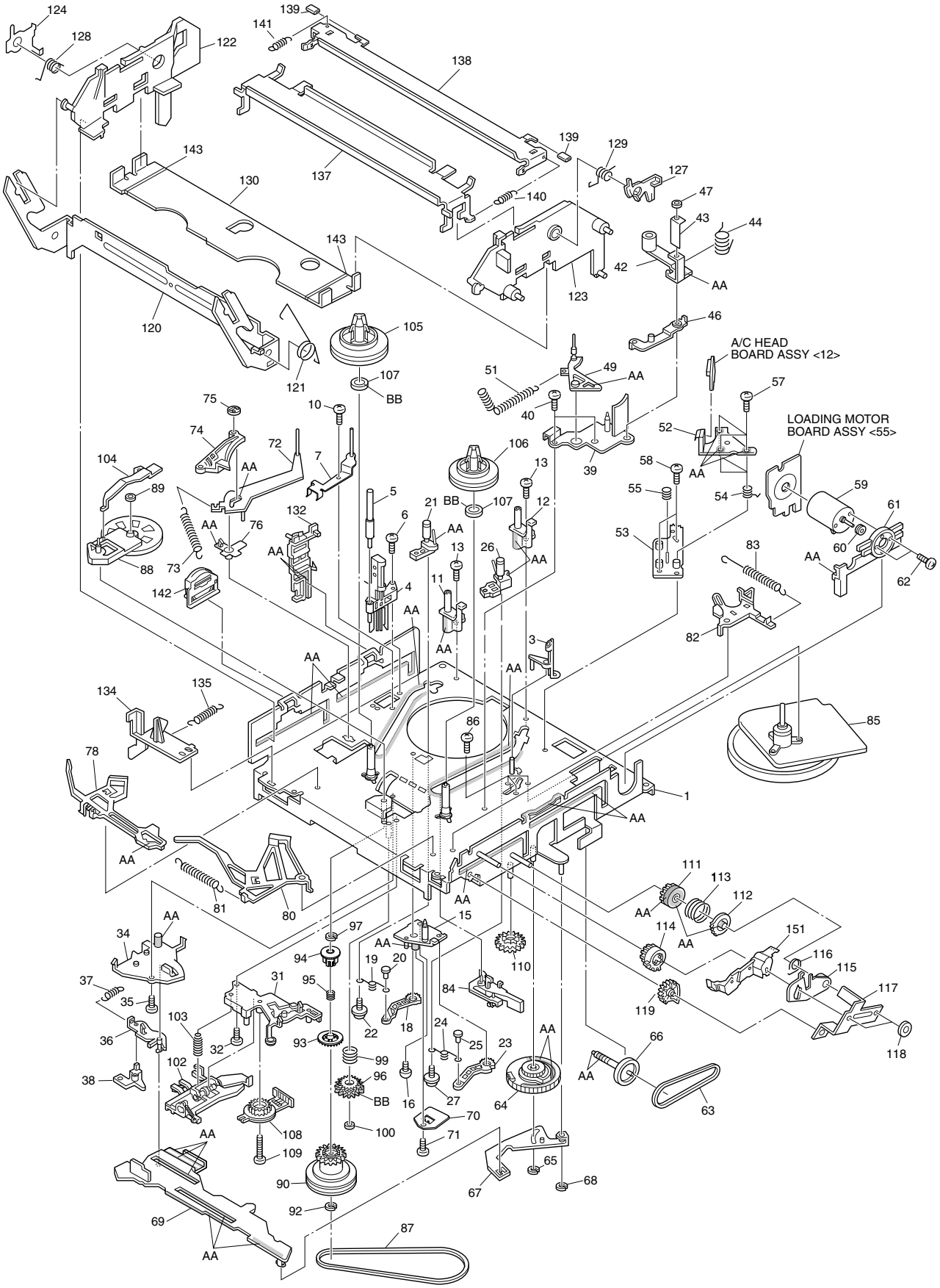
****

FINAL ASSEMBLY <M2>

⚠	501	LP10289-059A	FRONT PANEL ASSY,VP690U/U(C)
⚠		LP10289-057C	FRONT PANEL ASSY,VP790U/U(C)
	501A	LP20868-001A	CASSETTE DOOR
	501B	PQ46448	TORSION SPRING
	501C	LP20869-076A	DISPLAY WINDOW,VP790U/U(C)
		LP20869-078A	DISPLAY WINDOW,VP690U/U(C)
	501D	LP30649-002A	ORNAMENT,VP690U/U(C)
		LP21014-001C	ORNAMENT,VP790U/U(C)
⚠	502	LP10377-002A	TOP COVER
	503	QYTDSF3010M	SCREW,X2 TOP COVER(SIDE)
	504	QYTDSF3010M	SCREW,TERMINAL(REAR)
	505	LP20981-001A	DRUM SUB ASSY
	505A	LP20982-001A	UPPER DRUM ASSY
	505B	PDM4439	CAP
	505C	PDM4444-19-2	WASHER
	505D	LP40572-001A	COLLAR ASSY
	505E	LP40323-001A	CONTACT
	505F	LP30004-014A	COMPRESSION SPRING
	506	PDZ0179-1-4	ROTOR ASSY
	507	QYSPSP3006Z	SCREW,X2
⚠	508	QAR0169-001	STATOR ASSY
	509	QYSPSPH2606Z	SCREW,X2
	510	QYTDST2610Z	SCREW,X3 DRUM
⚠	511	LP10376-002B	BOTTOM CHASSIS
	513	LP30818-001A	BRACKET CHASSIS
	514	QYTDSF3010Z	SCREW,X2
	515	QYTDSF4012Z	SCREW,MECHA
	516	QYTDSF3010Z	SCREW,X2 MECHA
	524	LP40253-001B	STOPPER
	525	PQ40413	SPECIAL SCREW,MECHA
	529	LP30954-001A	KNOB ASSY,VP790U/U(C)
	530	QYTDSF2608Z	SCREW,X2,VP790U/U(C)
	WR1	QUQ212-0519CG	FFC WIRE,DRUM CN3002
	WR2	WJT0005-002A	E-CARD WIRE,A/C HEAD CN2001
	WR3	QUQ112-0914CG	FFC WIRE,FRONT CN7001

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION

5.3 MECHANISM ASSEMBLY <M4>



Classification	Part No.	Symbol in drawing
Grease	KYODO-SH-P	AA
Oil	COSMO-HV56	BB

NOTE: The section marked in **AA** and **BB** indicate lubrication and greasing areas.

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION

****

MECHANISM ASSEMBLY <M4>

		1	LP20821-006A	MAIN DECK ASSY
		3	LP30492-002B	GIDE POLE GUARD
		4	NAH0001-001	FULL ERASE HEAD
		5	LP40098-001B	GUIDE POLE(SUPPLY)
		6	QYTDST2608Z	SCREW,FE HEAD
		7	LP40637-002A	TENSION STUD BASE ASSY
		10	QYTDST2606Z	SCREW
		11	LP30409-002C	UV CATCHER 2
		12	LP30409-002C	UV CATCHER 2
		13	QYTPST2606Z	SCREW,X2
		15	LP30223-003C	LOADING ARM GEAR SHAFT
		16	QYTDST2606Z	SCREW
		18	LP30224-001B	LOADING ARM GEAR(SUPPLY)
		19	LP40099-001A	TORSION ARM
		20	LP40100-001A	PIN
		21	LP40101-006A	POLE BASE ASSY(SUPPLY)
		22	QYSPSTG2606Z	SCREW
		23	LP40103-002B	LOADING ARM GEAR(TAKE UP)
		24	LP40099-001A	TORSION ARM
		25	LP40100-001A	PIN
		26	LP40104-006A	POLE BASE ASSY(TAKE UP)
		27	QYSPSTG2606Z	SCREW
		31	LP20233-004B	ROTARY ENCODER GUIDE
		32	QYTPST2606Z	SCREW
		34	LP30226-004E	CONTROL PLATE GUIDE
		35	QYTPST2605Z	SCREW
		36	LP30249-003B	TAKE UP LEVER
		37	LP30003-006A	TENSION SPRING
		38	LP40119-002A	TAKE UP HEAD
		39	LP20234-004B	LID GUIDE
		40	QYTDST2606Z	SCREW,X2
		42	LP40105-003A	PINCH ROLLER ARM ASSY
		43	LP40753-001A	P.R.SHEET 3
		44	LP40148-002A	TORSION SPRING
		46	LP40149-001C	PRESS LEVER ASSY
		49	LP40106-007A	GUIDE ARM ASSY
		51	LP40134-002A	TENSION SPRING
		52	QAH0058-001	AC HEAD
		53	LP30228-001A	HEAD BASE
		54	LP30004-013A	COMPRESSION SPRING,X3
		55	LP40236-001A	COMPRESSION SPRING
		57	LP40213-002B	SPECIAL SCREW,X3
		58	QYTDST2608Z	SCREW,X2
		59	QAR0023-001	LOADING MOTOR
		60	PQ43546-1-2	MOTOR PULLEY
		61	LP30230-001B	MOTOR GUIDE
		62	QYTPSP3003Z	SCREW,X2
		63	LP30005-003A	BELT,LOADING MOTOR
		64	LP20791-002D	CONTROL CAM
		65	PQM30017-24	SLIT WASHER
		66	LP40120-001A	WORM GEAR
		67	LP40107-002A	LINK LEVER ASSY
		68	PQM30017-24	SLIT WASHER
		69	LP10201-003E	CONTROL PLATE
		70	LP40379-001B	CONTROL BRACKET(1)
		71	QYTDSF2608M	SCREW
		72	LP40108-002A	TENSION ARM ASSY
		73	LP30003-010A	TENSION SPRING
		74	LP40109-003D	TENSION BRAKE ASSY
		75	PQ46302-1-3	ADJUST PIN
		76	LP30232-002A	TENSION ARM BEARING
		78	LP40532-008B	MAIN BRAKE ASSY (SUPPLY)
		80	LP40111-011A	MAIN BRAKE ASSY (TAKE UP)
		81	LP30003-026A	TENSION SPRING
		82	LP40112-001F	SUB BRAKE ASSY(TAKE UP)
		83	LP40357-002A	TENSION SPRING
		84	LP40461-001A	CAPSTAN BRAKE ASSY
		85	QAR0087-005	CAPSTAN MOTOR
		86	QYTDSF2606M	SCREW,X3
		87	LP30005-007A	BELT,CAPSTAN MOTOR
		88	LP40114-012A	IDLER ARM ASSY
		89	LP40599-001A	WASHER
		90	LP40593-001A	CLUTCH UNIT 3
		92	PQM30017-47	SLIT WASHER
		93	LP30696-002A	CLUTCH GEAR 4
		94	LP30697-003A	COUPLING GEAR
		95	LP40554-002A	COMPRESION SPRING
		96	LP40442-001A	DIRECT GEAR
		97	LP30017-019A	SPACER
		99	LP40483-002A	COMPRESSION SPRING
		100	LP30016-001A	SLIT WASHER
		102	LP40484-001J	CHANGE LEVER ASSY
		103	LP40512-002B	COMPRESSION SPRING
		104	LP30236-002C	IDLER LEVER
		105	LP20237-001B	REEL DISK (SUPPLY)
		106	LP20238-001B	REEL DISK (TAKE UP)
		107	LP30017-015A	SPACER,X2
		108	QSW0554-003	ROTARY ENCODER
		109	QYTPST2620Z	SCREW
		110	LP30237-002B	CASSETTE GEAR
		111	LP30239-002G	LIMIT GEAR(1)
		112	LP30240-002G	LIMIT GEAR(2)
		113	LP40136-001E	TORSION SPRING
		114	LP30242-002A	RELAY GEAR
		115	LP30339-002E	OPENER GUIDE
		116	LP40545-001A	TORSION SPRING
		117	LP40214-001B	C.H.BRACKET
		118	PQM30017-47	SLIT WASHER,X2
		119	LP30243-001D	DRIVE GEAR
		120	LP20240-001G	DRIVE ARM
		121	LP40137-001A	TORSION SPRING
		122	LP10081-002L	SIDE HOLDER(L)
		123	LP10082-002M	SIDE HOLDER(R)
		124	LP30255-006A	LOCK LEVER(L)
		127	LP30256-001H	LOCK LEVER(R)
		128	LP40168-003A	TORSION SPRING(L)
		129	LP40218-001B	TORSION SPRING(R)
		130	LP30257-001G	CASSETTE HOLDER
		132	LP30244-002G	GUIDE RAIL
		134	LP30245-002F	REC SAFETY LEVER
		135	LP30003-004A	TENSION SPRING
		137	LP20578-001C	TOP GUIDE
		138	LP30500-001C	HOLD PLATE
		139	LP40450-003A	PAD,X2
		140	LP30003-025B	TENSION SPRING
		141	LP30003-024A	TENSION SPRING
		142	LP40481-003A	ROLLER CAM ASSY
		143	LP30019-014A	PAD,X2
		151	LP20324-003B	DOOR OPENER

5.4 ELECTRICAL PARTS LIST

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION
**********				

MAIN BOARD ASSEMBLY <03>

		PW1	LPA10130-03C1	MAIN BOARD ASSY,VP790U/U(C)
			LPA10130-04C1	MAIN BOARD ASSY,VP690U/U(C)
		IC1	JCP8021-NVD	IC
			or JCP8021-NVD-2	IC
	⚠	IC2201	AN3663FBP	IC
		IC3001	MN101D02GWA	IC
			or MN101DP02JAFWA	IC
		IC3002	BA6956AN	IC
		IC3004	S-24C04BFJ-X	IC
			or BR24C04F-W-X	IC
			or X24C04S	IC
			or 24LC04B/SN-X	IC
			or AT24C04N-10SC-X	IC
		IC5301	L5431	IC
			or MM1431AT	IC
		IC7002	GP1U291Q	IR DETECT UNIT
			or PIC-28143LJ	IR DETECT UNIT
			or PNA4652M00YC	IR DETECT UNIT
		Q22	2SC4081/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
		Q32	DTC144WU	TRANSISTOR
			or PDTC144WU	TRANSISTOR
			or RN1309	TRANSISTOR
			or UN521E	TRANSISTOR
		Q38	2SC4081/QRS/-X	TRANSISTOR
			or 2SD1819A/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
		Q901	2SA1576A/QRS/-X	TRANSISTOR
			or 2PA1576/R/-X	TRANSISTOR
		Q2001	2SC4081/QRS/-X	TRANSISTOR
			or 2SD1819A/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
		Q2002	2SC4081/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
			or 2SD1819A/QRS/-X	TRANSISTOR
		Q2003	DTA144WU	TRANSISTOR
			or PDTA144WU	TRANSISTOR
			or RN2309	TRANSISTOR
			or UN511E	TRANSISTOR
		Q2051	2SC4081/QRS/-X	TRANSISTOR
			or 2SD1819A/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
		Q2052	2SA1576A/QR/-X	TRANSISTOR
			or 2PA1576/R/-X	TRANSISTOR
			or 2SB1218A/QR/-X	TRANSISTOR
		Q2053	DTC144WU	TRANSISTOR
			or PDTC144WU	TRANSISTOR
			or RN1309	TRANSISTOR
			or UN521E	TRANSISTOR
		Q2054	2SA1576A/QR/-X	TRANSISTOR
			or 2SB1218A/QR/-X	TRANSISTOR
			or 2PA1576/R/-X	TRANSISTOR
		Q2055	DTC144WU	TRANSISTOR
			or PDTC144WU	TRANSISTOR
			or RN1309	TRANSISTOR
			or UN521E	TRANSISTOR
		Q2201	DTA144WU	TRANSISTOR
			or PDTA144WU	TRANSISTOR
			or RN2309	TRANSISTOR
			or UN511E	TRANSISTOR
		Q2202	DTC144WU	TRANSISTOR
			or PDTC144WU	TRANSISTOR
			or RN1309	TRANSISTOR
			or UN521E	TRANSISTOR
		Q2203	2SC4081/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
			or 2SD1819A/QRS/-X	TRANSISTOR
		Q2204	2SC4081/QRS/-X	TRANSISTOR
			or 2SD1819A/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
		Q2251	DTA144WU	TRANSISTOR
			or PDTA144WU	TRANSISTOR
			or RN2309	TRANSISTOR
			or UN511E	TRANSISTOR
		Q2252	DTC114EU	TRANSISTOR
			or PDTC114EU	TRANSISTOR
			or RN1302	TRANSISTOR
			or UN5211	TRANSISTOR
		Q3002	PTZ-NV16A	PHOTO TRANSISTOR
		Q3005	UN521K	TRANSISTOR,VP790U/U(C)
			or DTC114WU	TRANSISTOR,VP790U/U(C)
		Q3006	2SC4081/QRS/-X	TRANSISTOR
		Q3007	2SC4081/QRS/-X	TRANSISTOR
		Q4001	UN5211	TRANSISTOR
			or RN1302	TRANSISTOR
			or DTC114EU	TRANSISTOR
			or PDTC114EU	TRANSISTOR
		Q4002	2SD1819A/QRS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
			or 2SC4081/QRS/-X	TRANSISTOR
		Q5101	2SK2043-CB14	FE TRANSISTOR
			or 2SK2043	FE TRANSISTOR
			or 2SK2325	POWER MOS FET
			or 2SK2325-LT	POWER MOS FET
		Q5102	2SD2144S/UV/-T	TRANSISTOR
		Q5303	2SD1819A/RS/-X	TRANSISTOR
			or 2SC4081/RS/-X	TRANSISTOR
			or 2PC4081/R/-X	TRANSISTOR
		Q5304	2SD2144S/UV/-T	TRANSISTOR
		Q5305	DTA114EU	TRANSISTOR
			or PDTA114EU	TRANSISTOR
			or RN2302	TRANSISTOR
			or UN5111	TRANSISTOR
		Q5306	DTC114EU	TRANSISTOR
			or PDTC114EU	TRANSISTOR
			or RN1302	TRANSISTOR
			or UN5211	TRANSISTOR
		Q5321	2SC3616/ML/-T	TRANSISTOR
		Q6030	2SB1218A/QR/-X	TRANSISTOR
			or 2SA1576A/QR/-X	TRANSISTOR
			or 2PA1576/R/-X	TRANSISTOR
		Q7001	DTA143TU	TRANSISTOR
		Q7002	DTA143TU	TRANSISTOR
		Q7003	DTA143TU	TRANSISTOR
		Q7004	DTA143TU	TRANSISTOR
		Q7005	DTA143TU	TRANSISTOR
		Q7006	DTC143TU	TRANSISTOR
		Q7007	DTC143TU	TRANSISTOR

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		Q7008	DTC143TU	TRANSISTOR	
		Q7009	DTC143TU	TRANSISTOR	
		Q7010	DTC143TU	TRANSISTOR	
		Q7011	DTC143TU	TRANSISTOR	
		Q7012	DTC143TU	TRANSISTOR	
		Q7013	DTC144WU	TRANSISTOR,VP790U/U(C)	
		Q7201	2SA720/RS/-T	TRANSISTOR,VP790U/U(C)	
		D3001	LNB2301L01VI	LE DIODE	
		D3002	1SS133	DIODE	
			or 1SS270A	DIODE	
		D3005	11ES2	DIODE	
			or 1A3G	DIODE	
		D3007	1SS355	DIODE,VP790U/U(C)	
		D3016	MTZJ3.9B	ZENER DIODE	
			or RD3.9ES/B2/-T2	ZENER DIODE	
		D5001	S1WB/A/60-4102	BRIDGE DIODE	
			or S1WB/A/60-X	BRIDGE DIODE	
			or S1WB(A)60F4072X	BRIDGE DIODE	
		D5101	AU01	FR DIODE	
			or ERA18-04-T2	FR DIODE	
			or 1SR153-400-T2	FR DIODE	
			or 10ELS4	FR DIODE	
		D5102	AU01	FR DIODE	
			or ERA18-04-T2	FR DIODE	
			or 1SR153-400-T2	FR DIODE	
			or 10ELS4	FR DIODE	
		D5103	1SS133	DIODE	
			or 1SS270A	DIODE	
		D5105	1SS133	DIODE	
			or 1SS270A	DIODE	
		D5203	AU01Z	FR DIODE	
			or ERA18-02-T2	FR DIODE	
			or PG104RS	FR DIODE	
			or 10ELS2	FR DIODE	
			or 1SR153-400-T2	FR DIODE	
		D5204	AU01Z	FR DIODE	
			or PG104RS	FR DIODE	
			or 10ELS2	FR DIODE	
			or ERA18-02-T2	FR DIODE	
			or 1SR153-400-T2	FR DIODE	
		D5207	AK04	DIODE	
			or 1S4	SB DIODE	
			or 11EQS04	SB DIODE	
		D5210	AU01Z	FR DIODE	
			or ERA18-02-T2	FR DIODE	
			or 10ELS2	FR DIODE	
			or 1SR153-400-T2	FR DIODE	
			or PG104RS	FR DIODE	
		D5301	MTZJ15C	ZENER DIODE	
			or RD15ES/B3/-T2	ZENER DIODE	
		D5303	RD5.1JS/B2/-T2	ZENER DIODE	
			or MA4051N/M/-T2	ZENER DIODE	
		D5304	1SS133	DIODE	
			or 1SS270A	DIODE	
		D5307	QUY160-100Y	IM BUS WIRE	
		D5316	QUY160-100Y	IM BUS WIRE	
		D6002	HZ30-2L-T2	ZENER DIODE	
			or HZ30-2LTD	Z DIODE (M)	
		D7009	SLR-325VC-T	LE DIODE,VP790U/U(C)	
		R1	NRSA63J-682X	MG RESISTOR	6.8kΩ,1/16W
		R2	NRSA63J-152X	MG RESISTOR	1.5kΩ,1/16W

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		R3	NRSA63J-822X	MG RESISTOR	8.2kΩ,1/16W
		R6	NRSA63J-273X	MG RESISTOR	27kΩ,1/16W
		R7	NRSA63J-821X	MG RESISTOR	820Ω,1/16W
		R8	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		R9	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		R12	QUY153-050Y	IM BUS WIRE	
		R37	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		R49	NRSA63J-561X	MG RESISTOR	560Ω,1/16W
		R66	NRSA63J-104X	MG RESISTOR	100kΩ,1/16W
		R77	NRSA63J-103X	MG RESISTOR	10kΩ,1/16W
		R90	NRSA63J-471X	MG RESISTOR	470Ω,1/16W
		R92	NRSA63J-152X	MG RESISTOR	1.5kΩ,1/16W
		R93	NRSA63J-102X	MG RESISTOR	1kΩ,1/16W
		R104	NRSA63J-682X	MG RESISTOR	6.8kΩ,1/16W
		R118	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		R201	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R202	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
		R901	NRSA02J-750X	MG RESISTOR	75Ω,1/10W
		R904	QRE123J-331X	RESISTOR	330Ω,1/2W
		R905	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
		R911	NRSA02J-750X	MG RESISTOR,VP790U/U(C)	75Ω,1/10W
		R912	NRSA02J-750X	MG RESISTOR	75Ω,1/10W
		R2003	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
		R2007	NRSA02J-123X	MG RESISTOR	12kΩ,1/10W
		R2010	NRSA02J-123X	MG RESISTOR	12kΩ,1/10W
		R2013	NRSA63J-682X	MG RESISTOR	6.8kΩ,1/16W
		R2014	NRSA63J-224X	MG RESISTOR	220kΩ,1/16W
		R2015	NRSA63J-181X	MG RESISTOR	180Ω,1/16W
		R2016	NRSA63J-473X	MG RESISTOR	47kΩ,1/16W
		R2017	NRSA63J-123X	MG RESISTOR	12kΩ,1/16W
		R2018	NRSA63J-472X	MG RESISTOR	4.7kΩ,1/16W
		R2019	NRSA63J-472X	MG RESISTOR	4.7kΩ,1/16W
		R2024	NRSA63J-332X	MG RESISTOR	3.3kΩ,1/16W
		R2053	NRSA63J-272X	MG RESISTOR	2.7kΩ,1/16W
		R2054	NRSA02J-123X	MG RESISTOR	12kΩ,1/10W
		R2055	NRSA02J-3R3X	MG RESISTOR	3.3Ω,1/10W
		R2056	NRSA02J-820X	MG RESISTOR	82Ω,1/10W
		R2057	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
		R2058	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
		R2059	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
		R2060	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
		R2201	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
		R2202	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
		R2203	NRSA02J-473X	MG RESISTOR,VP790U/U(C)	47kΩ,1/10W
		R2204	NRSA02J-682X	MG RESISTOR,VP790U/U(C)	6.8kΩ,1/10W
		R2205	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
		R2206	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
		R2207	NRSA02J-473X	MG RESISTOR,VP790U/U(C)	47kΩ,1/10W
		R2208	NRSA02J-682X	MG RESISTOR,VP790U/U(C)	6.8kΩ,1/10W
		R2209	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
		R2210	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R2211	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R2212	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R2213	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R2214	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
		R2215	QRE141J-221Y	RESISTOR	220Ω,1/4W
		R2216	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R2217	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R2218	NRSA02J-392X	MG RESISTOR	3.9kΩ,1/10W
		R2219	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R2220	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		R2221	QRE141J-102Y	RESISTOR	1kΩ,1/4W
		R2222	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R2225	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R2251	NRSA63J-222X	MG RESISTOR	2.2kΩ,1/16W
		R2252	NRSA63J-152X	MG RESISTOR	1.5kΩ,1/16W
		R2253	QRE141J-101Y	RESISTOR	100Ω,1/4W
		R2254	NRSA63J-102X	MG RESISTOR	1kΩ,1/16W
		R2255	NRSA63J-273X	MG RESISTOR	27kΩ,1/16W
		R3001	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R3017	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R3018	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R3021	QUY160-100Y	IM BUS WIRE	
		R3027	QUY160-100Y	IM BUS WIRE	
		R3028	NRSA63J-102X	MG RESISTOR	1kΩ,1/16W
		R3031	NRSA02J-102X	MG RESISTOR,VP690U/U(C)	1kΩ,1/10W
		R3056	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R3057	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R3060	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R3090	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R3114	QRE141J-0R0Y	RESISTOR	0Ω,1/4W
		R3116	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3117	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3201	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R3206	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3207	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3208	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3209	QRE141J-181Y	RESISTOR	180Ω,1/4W
		R3211	NRSA02J-183X	MG RESISTOR	18kΩ,1/10W
		R3212	NRSA02J-181X	MG RESISTOR	180Ω,1/10W
		R3213	QRE141J-273Y	RESISTOR	27kΩ,1/4W
		R3214	NRSA02J-181X	MG RESISTOR	180Ω,1/10W
		R3215	NRSA02J-273X	MG RESISTOR	27kΩ,1/10W
		R3216	NRSA02J-474X	MG RESISTOR	470kΩ,1/10W
		R3217	NRSA02J-334X	MG RESISTOR	330kΩ,1/10W
		R3218	NRSA02J-562X	MG RESISTOR	5.6kΩ,1/10W
		R3219	QRE141J-103Y	RESISTOR	10kΩ,1/4W
		R3220	NRSA02J-562X	MG RESISTOR	5.6kΩ,1/10W
		R3222	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R3223	NRSA63J-105X	MG RESISTOR	1MΩ,1/16W
		R3224	NRSA63J-101X	MG RESISTOR	100Ω,1/16W
		R3226	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3227	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R3236	NRSA02J-103X	MG RESISTOR,VP790U/U(C)	10kΩ,1/10W
		R3237	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R3238	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R3240	QRE141J-103Y	RESISTOR,VP790U/U(C)	10kΩ,1/4W
		R3241	QRE141J-103Y	RESISTOR,VP790U/U(C)	10kΩ,1/4W
		R3242	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R3243	NRSA02J-681X	MG RESISTOR	680Ω,1/10W
		R3244	NRSA02J-331X	MG RESISTOR	330Ω,1/10W
		R3245	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
		R4001	QRE141J-222Y	RESISTOR	2.2kΩ,1/4W
		R4002	QRE141J-562Y	RESISTOR	5.6kΩ,1/4W
		R4003	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
		R4004	QUY160-100Y	IM BUS WIRE	
		R4006	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R4010	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R4011	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R4012	NRSA02J-153X	MG RESISTOR	15kΩ,1/10W
		R4013	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R4018	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		R4019	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R4020	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R4021	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R4024	QRE141J-103Y	RESISTOR	10kΩ,1/4W
	⚠	R5001	QRZ9046-475Z	RESISTOR	4.7MΩ,1/2W
		R5101	QRE141J-224Y	RESISTOR	220kΩ,1/4W
		R5102	QRE141J-224Y	RESISTOR	220kΩ,1/4W
		R5103	QRE141J-683Y	RESISTOR	68kΩ,1/4W
		R5104	QRG02GJ-683	OMF RESISTOR	68kΩ,2W
		R5106	QRT01DJ-R39X	MF RESISTOR	0.39Ω,1W
		R5107	QRE121J-331Y	RESISTOR	330Ω,1/2W
		R5108	NRSA02J-122X	MG RESISTOR	1.2kΩ,1/10W
		R5109	QRE141J-681Y	RESISTOR	680Ω,1/4W
		R5110	NRSA02J-224X	MG RESISTOR	220kΩ,1/10W
		R5111	NRSA02J-821X	MG RESISTOR	820Ω,1/10W
		R5112	NRSA02J-221X	MG RESISTOR	220Ω,1/10W
		R5301	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R5302	NRSA02J-152X	MG RESISTOR	1.5kΩ,1/10W
		R5303	NRSA02J-152X	MG RESISTOR	1.5kΩ,1/10W
		R5304	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R5305	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R5306	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R5308	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R5309	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R5310	NRSA02J-471X	MG RESISTOR	470Ω,1/10W
		R5311	NRSA02J-473X	MG RESISTOR	47kΩ,1/10W
		R5312	NRVA02D-332X	CMF RESISTOR	3.3kΩ,1/10W
		R5313	NRVA02D-362X	CMF RESISTOR	3.6kΩ,1/10W
		R5314	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R5316	NRVA02D-822X	CMF RESISTOR	8.2kΩ,1/10W
		R5332	QRE141J-222Y	RESISTOR	2.2kΩ,1/4W
		R6020	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R6021	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R6030	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R6031	QUY153-050Y	IM BUS WIRE	
		R6050	QUY160-100Y	IM BUS WIRE	
		R6054	NRSA02J-102X	MG RESISTOR	1kΩ,1/10W
		R6502	NRSA02J-332X	MG RESISTOR	3.3kΩ,1/10W
		R7001	QRE141J-331Y	RESISTOR	330Ω,1/4W
		R7002	NRSA02J-331X	MG RESISTOR	330Ω,1/10W
		R7003	NRSA02J-331X	MG RESISTOR	330Ω,1/10W
		R7004	NRSA02J-331X	MG RESISTOR	330Ω,1/10W
		R7005	NRSA63J-331X	MG RESISTOR	330Ω,1/16W
		R7006	NRSA02J-331X	MG RESISTOR	330Ω,1/10W
		R7007	NRSA63J-331X	MG RESISTOR	330Ω,1/16W
		R7008	NRSA02J-331X	MG RESISTOR,VP790U/U(C)	330Ω,1/10W
		R7015	QUY153-050Y	IM BUS WIRE	
		R7020	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R7021	NRSA02J-122X	MG RESISTOR	1.2kΩ,1/10W
		R7022	NRSA02J-182X	MG RESISTOR	1.8kΩ,1/10W
		R7023	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
		R7024	NRSA02J-272X	MG RESISTOR	2.7kΩ,1/10W
		R7025	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
		R7030	NRSA02J-103X	MG RESISTOR	10kΩ,1/10W
		R7031	NRSA02J-122X	MG RESISTOR	1.2kΩ,1/10W
		R7032	NRSA02J-182X	MG RESISTOR	1.8kΩ,1/10W
		R7033	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
		R7034	NRSA02J-0R0X	MG RESISTOR,VP690U/U(C)	0Ω,1/10W
			NRSA02J-272X	MG RESISTOR,VP790U/U(C)	2.7kΩ,1/10W
		R7035	NRSA02J-472X	MG RESISTOR,VP790U/U(C)	4.7kΩ,1/10W
		R7036	NRSA02J-682X	MG RESISTOR,VP790U/U(C)	6.8kΩ,1/10W

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		R7037	NRSA02J-563X	MG RESISTOR	56kΩ,1/10W
		R7171	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R7172	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		R7202	QRE141J-471Y	RESISTOR,VP790U/U(C)	470Ω,1/4W
		R7203	NRSA02J-222X	MG RESISTOR	2.2kΩ,1/10W
		R7204	QRE123J-100X	RESISTOR,VP790U/U(C)	10Ω,1/2W
		VR6502	QVP0039-223Z	TRIM RESISTOR,T SEP ADJ	
		B6	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		B23	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		B2201	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		B3001	QUY153-050Y	IM BUS WIRE	
		B5001	QUY160-100Y	IM BUS WIRE	
		B5002	QUY160-100Y	IM BUS WIRE	
		B5301	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		B6020	QUY160-075Y	IM BUS WIRE	
		B7002	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		B7005	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		B7006	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		B7009	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		C1	NCF31AZ-105X	CAPACITOR	1μF,10V
		C2	NCF31AZ-105X	CAPACITOR	1μF,10V
		C3	NCF31AZ-105X	CAPACITOR	1μF,10V
		C4	NCF31AZ-105X	CAPACITOR	1μF,10V
		C5	QEKC1CM-476	E CAPACITOR	47μF,16V
		C6	NCB11EK-104X	CAPACITOR	0.1μF,25V
		C7	NCB21HK-471X	CAPACITOR	470pF,50V
		C8	NCB31CK-104X	CAPACITOR	0.1μF,16V
		C9	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C10	NDC31HJ-151X	CAPACITOR	150pF,50V
		C11	NCB31CK-104X	CAPACITOR	0.1μF,16V
		C12	NDC31HJ-330X	CAPACITOR	33pF,50V
		C14	NCB31CK-104X	CAPACITOR	0.1μF,16V
		C15	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C16	NCB31CK-104X	CAPACITOR	0.1μF,16V
		C17	QEKJ1HM-335	E CAPACITOR	3.3μF,50V
		C18	QEKJ1HM-105	E CAPACITOR,VP790U/U(C)	1μF,50V
		C19	QEKJ1HM-225	E CAPACITOR	2.2μF,50V
		C20	QEKJ1HM-105	E CAPACITOR	1μF,50V
		C21	NCB31CK-104X	CAPACITOR	0.1μF,16V
		C22	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
		C23	NCB31CK-223X	CAPACITOR	0.022μF,16V
		C24	QCFB1HZ-104	CAPACITOR	0.1μF,50V
		C25	NDC31HJ-5R0X	CAPACITOR	5pF,50V
		C26	NCB31CK-223X	CAPACITOR	0.022μF,16V
		C27	NCB31EK-223X	CAPACITOR	0.022μF,25V
		C28	QEKJ1HM-335	E CAPACITOR	3.3μF,50V
		C29	NCB31EK-472X	CAPACITOR	0.0047μF,25V
		C30	QEKJ1HM-474	E CAPACITOR	0.47μF,50V
		C31	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
		C32	QDYB1CM-103Y	CAPACITOR	0.01μF,16V
		C33	QEKJ1HM-225	E CAPACITOR	2.2μF,50V
		C34	NCB21EK-104X	CAPACITOR	0.1μF,25V
		C35	NCB31CK-333X	CAPACITOR	0.033μF,16V
		C36	QEKJ1EM-475	E CAPACITOR	4.7μF,25V
		C37	QEKJ1EM-475	E CAPACITOR	4.7μF,25V
		C38	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
		C39	NCB31CK-223X	CAPACITOR	0.022μF,16V
		C40	QEKJ1CM-106	E CAPACITOR	10μF,16V
		C51	QERF1HM-105	E CAPACITOR	1μF,50V
		C54	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		C62	NCB31CK-104X	CAPACITOR	0.1μF,16V

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		C109	NCB31AK-224X	CAPACITOR	0.22μF,10V
		C110	NDC31HJ-331X	CAPACITOR	330pF,50V
		C201	QERF0JM-476	E CAPACITOR	47μF,6.3V
		C202	NCB21EK-223X	CAPACITOR	0.022μF,25V
		C203	QERF1HM-105	E CAPACITOR	1μF,50V
		C205	NDC21HJ-101X	CAPACITOR	100pF,50V
		C207	NCF21CZ-105X	CAPACITOR	1μF,16V
		C208	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		C210	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		C901	QETN0JM-477	E CAPACITOR	470μF,6.3V
		C904	NCB21EK-223X	CAPACITOR	0.022μF,25V
		C2001	QEKJ1HM-475	E CAPACITOR	4.7μF,50V
		C2002	QEKJ1HM-105	E CAPACITOR	1μF,50V
		C2003	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
		C2005	QEKJ1HM-475	E CAPACITOR	4.7μF,50V
		C2006	NCB31EK-123X	CAPACITOR	0.012μF,25V
		C2007	QEKJ1CM-226	E CAPACITOR	22μF,16V
		C2008	QEKJ1HM-475	E CAPACITOR	4.7μF,50V
		C2009	NCB31HK-102X	CAPACITOR	0.001μF,50V
		C2010	NCB31HK-222X	CAPACITOR	0.0022μF,50V
		C2011	QEKJ1HM-475	E CAPACITOR	4.7μF,50V
		C2012	QEKJ1HM-475	E CAPACITOR	4.7μF,50V
		C2051	QCBB1HK-331	CAPACITOR	330pF,50V
		C2052	QFN31HJ-823	F CAPACITOR	0.082μF,50V
		C2053	NCB21HK-472X	CAPACITOR	0.0047μF,50V
		C2054	NCB21EK-223X	CAPACITOR	0.022μF,25V
		C2055	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2201	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2202	QEKJ1EM-475	E CAPACITOR,VP690U/U(C)	4.7μF,25V
			QEKJ1HM-475	E CAPACITOR,VP790U/U(C)	4.7μF,50V
		C2203	QEKJ1HM-475	E CAPACITOR	4.7μF,50V
		C2204	QEKJ0JM-336	E CAPACITOR	33μF,6.3V
		C2205	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2206	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2207	NCB31EK-153X	CAPACITOR	0.015μF,25V
		C2208	NCB31EK-153X	CAPACITOR	0.015μF,25V
		C2209	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2210	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2211	QEKJ0JM-336	E CAPACITOR	33μF,6.3V
		C2212	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
		C2214	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2215	QEKC1EM-106	E CAPACITOR	10μF,25V
		C2216	QEKJ1CM-476	E CAPACITOR	47μF,16V
		C2218	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2219	QEKC1CM-226	E CAPACITOR	22μF,16V
		C2220	QEKJ1EM-106	E CAPACITOR	10μF,25V
		C2221	NCB21EK-223X	CAPACITOR	0.022μF,25V
		C2222	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C2251	NCB21HK-103X	CAPACITOR	0.01μF,50V
		C2252	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C2253	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C2254	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
		C2255	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C2256	NCB21HK-103X	CAPACITOR	0.01μF,50V
		C2257	NCB31EK-103X	CAPACITOR	0.01μF,25V
		C2259	QEKJ1HM-334	E CAPACITOR	0.33μF,50V
		C2260	NRSA63J-684X	MG RESISTOR	680kΩ,1/16W
		C3001	NCB21EK-223X	CAPACITOR	0.022μF,25V
		C3003	QEKJ1CM-106	E CAPACITOR	10μF,16V
		C3004	NDC31HJ-101X	CAPACITOR	100pF,50V
		C3008	NCB21HK-103X	CAPACITOR	0.01μF,50V

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		C3011	QEKJ1HM-475	E CAPACITOR	4.7µF,50V
		C3016	NDC21HJ-180X	CAPACITOR	18pF,50V
		C3017	NDC21HJ-270X	CAPACITOR	27pF,50V
		C3019	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		C3023	NCF21CZ-105X	CAPACITOR	1µF,16V
		C3035	NCB31EK-223X	CAPACITOR	0.022µF,25V
		C3036	QERF0JM-107	E CAPACITOR	100µF,6.3V
		C3041	NDC21HJ-101X	CAPACITOR	100pF,50V
		C3042	NDC21HJ-101X	CAPACITOR	100pF,50V
		C3049	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C3050	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C3052	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C3053	QDYB1CM-103Y	CAPACITOR	0.01µF,16V
		C4001	NCB21EK-104X	CAPACITOR	0.1µF,25V
		C4002	QERF1HM-105	E CAPACITOR	1µF,50V
		C4004	QERF1AM-336	E CAPACITOR	33µF,10V
		C4006	NCB21EK-563X	CAPACITOR	0.056µF,25V
		C4007	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C4009	NCB21HK-102X	CAPACITOR	0.001µF,50V
		C4010	QERF0JM-476	E CAPACITOR	47µF,6.3V
		C4011	NCB21CK-224X	CAPACITOR	0.22µF,16V
		C4014	NDC21HJ-101X	CAPACITOR	100pF,50V
		C4015	NDC21HJ-101X	CAPACITOR	100pF,50V
		C4019	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C4022	NDC21HJ-101X	CAPACITOR	100pF,50V
	⚠	C5001	QFZ9073-683	F CAPACITOR	0.068µF,250V
	⚠	C5004	QCZ9094-472	CAPACITOR	0.0047µF,125V
		C5006	QETM2DM-476	E CAPACITOR	47µF,200V
		C5101	QCZ0212-472	CAPACITOR	0.0047µF,1kV
		C5102	QCZ0339-101Z	CAPACITOR	100pF,1kV
		C5104	QEKJ1HM-105	E CAPACITOR	1µF,50V
		C5105	QFN31HJ-183	F CAPACITOR	0.018µF,50V
		C5106	QCBB1HJ-271	CAPACITOR	270pF,50V
		C5107	QFV11HJ-104	F CAPACITOR	0.1µF,50V
		C5202	QETN1CM-108	E CAPACITOR	1000µF,16V
		C5203	QETN1AM-108	E CAPACITOR	1000µF,10V
		C5204	QETJ2AM-475	E CAPACITOR	4.7µF,100V
		C5206	QEKJ1CM-476	E CAPACITOR	47µF,16V
		C5207	QEKJ1CM-107	E CAPACITOR	100µF,16V
		C5301	QEKJ1CM-107	E CAPACITOR	100µF,16V
		C5302	QETN1HM-106	E CAPACITOR	10µF,50V
		C5303	QEKJ1CM-107	E CAPACITOR	100µF,16V
		C5304	QFLC1HJ-102Z	F CAPACITOR	0.001µF,50V
		C5305	QFV91HJ-154	F CAPACITOR	0.15µF,50V
		C6029	NRSA02J-0R0X	MG RESISTOR	0Ω,1/10W
		C6501	NCB21EK-104X	CAPACITOR	0.1µF,25V
		C6502	QEKC1CM-106	E CAPACITOR,VP690U/U(C)	10µF,16V
			QEKC1HM-106	E CAPACITOR,VP790U/U(C)	10µF,50V
		C6503	QEKJ1HM-105	E CAPACITOR	1µF,50V
		C6504	QCFB1HZ-104	CAPACITOR	0.1µF,50V
		C6506	QEKJ1HM-105	E CAPACITOR	1µF,50V
		C6508	NCB21EK-223X	CAPACITOR	0.022µF,25V
		C6509	NCB21EK-104X	CAPACITOR	0.1µF,25V
		C6512	NCB21EK-223X	CAPACITOR	0.022µF,25V
		C6513	QEKJ1HM-225	E CAPACITOR	2.2µF,50V
		C6514	NCB21EK-223X	CAPACITOR	0.022µF,25V
		C6515	QEKC1HM-335	E CAPACITOR	3.3µF,50V
		C6516	QEKJ1EM-475	E CAPACITOR,VP690U/U(C)	4.7µF,25V
			QEKJ1HM-475	E CAPACITOR,VP790U/U(C)	4.7µF,50V
		C6517	NCB21CK-224X	CAPACITOR	0.22µF,16V
		C7011	QEKJ0JM-227	E CAPACITOR	220µF,6.3V
		C7013	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C7014	NCB21HK-103X	CAPACITOR	0.01µF,50V
		C7206	QETF0JM-227	E CAPACITOR,VP790U/U(C)	220µF,6.3V
		L1	QQL29BJ-100Z	COIL	10µH
		L2	QUY153-050Y	IM BUS WIRE	
		L3	QQL29BJ-100Z	COIL	10µH
		L4	QQL29BJ-100Z	COIL	10µH
		L5	QQL29BJ-100Z	COIL	10µH
		L11	QQL01BJ-120Z	COIL	12µH
		L24	QUY153-050Y	IM BUS WIRE	
		L28	QQL231J-150Y	COIL	15µH
		L201	QUY153-050Y	IM BUS WIRE	
		L203	QQL231J-4R7Y	COIL	4.7µH
		L901	QQL29BJ-100Z	COIL	10µH
		L2001	QUY153-050Y	IM BUS WIRE	
		L2201	QUY153-050Y	IM BUS WIRE	
		L2251	QQL29BJ-100Z	COIL	10µH
		L5201	PELN1184	COIL	33µH
		L5202	PELN1184	COIL	33µH
		L6001	QUY153-050Y	IM BUS WIRE	
		L6003	QUY153-050Y	IM BUS WIRE	
		L6032	QUY153-050Y	IM BUS WIRE	
		L6050	QUY153-050Y	IM BUS WIRE	
		L6501	QUY153-050Y	IM BUS WIRE	
		L7201	QQL29BJ-101Z	COIL,VP790U/U(C)	100µH
		X2	QAX0575-001	CRYSTAL RESONATOR	
		X3001	QAX0526-001Z	CRYSTAL RESONATOR	
		S3001	QSW0602-004	PUSH SWITCH,REC.SAFETY	
		S7001	QSW0456-002Z	TACT SWITCH,POWER	
		S7002	QSW0456-002Z	TACT SWITCH,REC LINK	
		S7004	QSW0456-002Z	TACT SWITCH,CH-	
		S7006	QSW0456-002Z	TACT SWITCH,CH+	
		S7008	QSW0456-002Z	TACT SWITCH,REVIEW,VP690U/U(C)	
			QSW0456-002Z	TACT SWITCH,PLAY,VP790U/U(C)	
		S7010	QSW0456-002Z	TACT SWITCH,SP/EP,VP690U/U(C)	
			QSW0456-002Z	TACT SWITCH,E.PROG.,VP790U/U(C)	
		S7011	QSW0456-002Z	TACT SWITCH,REC	
		S7013	QSW0456-002Z	TACT SWITCH,PAUSE	
		S7015	QSW0456-002Z	TACT SWITCH,STOP/EJECT	
		S7016	QSW0456-002Z	TACT SWITCH,DISPLAY	
		K2001	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		K2002	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		K2003	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		K2004	NRSA63J-0R0X	MG RESISTOR	0Ω,1/16W
		K5101	QQR0678-001Z	FERRITE BEAD	
		K5102	QUY153-050Y	IM BUS WIRE	
		PC3001	GP3S123	IC(PHOTO SENSOR)	
		PC3002	GP3S123	IC(PHOTO SENSOR)	
	⚠	PC5101	PC817X	IC(PHOTO COUPLER)	
		T2051	PELN0832	OSC TRANSFORMER	
	⚠	T5001	QQS0083-001	SW TRANSFORMER	
		ET1	LP30859-001A	EARTH PLATE	
		J1	QNN0380-002	PIN JACK,A/V IN,VP790U/U(C)	
		J2	QNN0286-002	PIN JACK,A/V OUT	
		J7101	QNN0381-001	PIN JACK,FRONT IN	
		FC5001	QNG0006-001Z	FUSE CLIP,F5001	
		FC5002	QNG0006-001Z	FUSE CLIP,F5001	
		FW3001	QUM023-15A4A4	PARA RIBON WIRE,VP790U/U(C)	
	⚠	LF5002	QQR0532-001	LINE FILTER	
		SG5001	QUY160-150Y	IM BUS WIRE	
	⚠	VA5001	QAF0023-431Z	VARISTOR	

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	⚠	TB1	LP20978-001A	TERMINAL BOARD,VP690U/U(C)	
	⚠		LP20978-003A	TERMINAL BOARD,VP790U/U(C)	
	⚠	CD1	QMPD340-165-K	POWER CORD	
		SD1	LP20990-001A	SHEILD PLATE	
		DI7001	LTG-Y2K12M-01J	LE DIODE	
		TU6001	QAU0207-001	TUNER	
		CN1	QGF1028C1-11	FPC CONNECTOR,(1-11)U.DRUM	
		CN2001	QGF1207C1-07	FPC CONNECTOR,(1-7)A/C HEAD	
		CN2002	QGB2532J1-02	CONNECTOR,(1-2)FE HEAD	
		CN3001	QGB2015M2-08	CONNECTOR,(1-8)CAPSTAN MOTOR	
		CN3002	QGF1207C1-05	FPC CONNECTOR,(1-5)DRUM MDA	
		CN3003	QGB2532J1-02	CONNECTOR,(1-2)LOADING MOTOR	
		CN3004	QGB2534J2-04	CONNECTOR,(1-4)ROTARY ENCODER	
		CN7001	QGF1207C1-09	FPC CONNECTOR,(1-9)FRONT	
	⚠	CP4001	ICP-N25	CIRCUIT PROTECTOR	
	⚠	CP5302	ICP-N25	CIRCUIT PROTECTOR	
	⚠	F5001	QMF51N2-1R25J1	FUSE	T1.25A,AC250V

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A/C HEAD BOARD ASSEMBLY <12>

PW1	LP10122-01A1	A/C HEAD BOARD ASSY	
CN1	QGF1208F1-07	FPC CONNECTOR	

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MINI FRONT BOARD ASSEEMBLY(HR-VP690U/U(C))<28>

PW6	LPA10130-01A6	MINI FRONT BOARD ASSY	
R7043	NRSA02J-272X	MG RESISTOR	2.7kΩ,1/10W
R7044	NRSA02J-472X	MG RESISTOR	4.7kΩ,1/10W
R7045	NRSA02J-682X	MG RESISTOR	6.8kΩ,1/10W
S7021	QSW0456-002Z	TACT SWITCH,REW	
S7022	QSW0456-002Z	TACT SWITCH,FF	
S7023	QSW0456-002Z	TACT SWITCH,PLAY	
CN7002	QGF1208C1-09	FPC CONNECTOR,(1-9)MAIN	

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ADV.JOG BOARD ASSEEMBLY(HR-VP790U/U(C))<38>

PW1	LPA20013-02B	ADV.JOG BOARD ASSY
UN7002	QSW0905-001	ROTARY ENCODER
CN7004	QGF1209F1-09	FPC CONNECTOR,(1-9)MAIN

#	⚠	REF No.	PART No.	PART NAME, DESCRIPTION	

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LOADING MOTOR BOARD ASSEMBLY <55>

PW2	LP10122-01A2	LOADING MOTOR BOARD ASSY	
CN1	QGB2533K1-02	CONNECTOR	

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C.BOX/R.PAUSE BOARD ASSEMBLY(HR-VP790U/U(C)<99>

PW2	LPA10130-01A2	C.BOX/R.PAUSE BOARD ASSY	
R7155	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
R7156	NRSA02J-101X	MG RESISTOR	100Ω,1/10W
J7104	PU60612	MINI JACK	
J7105	PU60612	MINI JACK	